The Era of AI Agents

Tech Guide 2025

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“ChatGPT becoming increasingly *agentic*, meaning it’s moving from simply answering questions to performing tasks proactively”

– Kevin Weil, OpenAI CPO

Welcome to the Era of AI Agents

In the future, these autonomous, intelligent systems will fundamentally change our working and personal lives.

This Tech Guide provides a comprehensive overview of the central role AI Agents play within digital transformation.

With current perspectives and practical insights, this guide shows how companies can automate processes, create personalized experiences, and drive innovation.

This Tech Guide offers you:

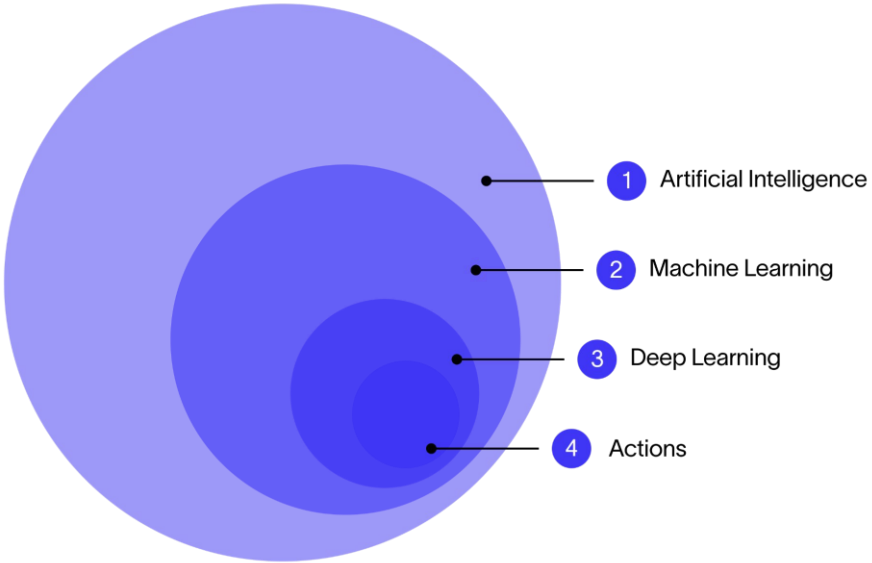
- ➔ **A comprehensive overview:** Understand the role of AI Agents and why they represent the next stage of digital transformation.
- ➔ **Current perspectives:** Learn how companies are using AI Agents to automate processes and deliver personalized real-time experiences.
- ➔ **Challenges:** Overcome the hurdles of AI development, integration, and governance for successful implementation.

AI – A Quick Overview

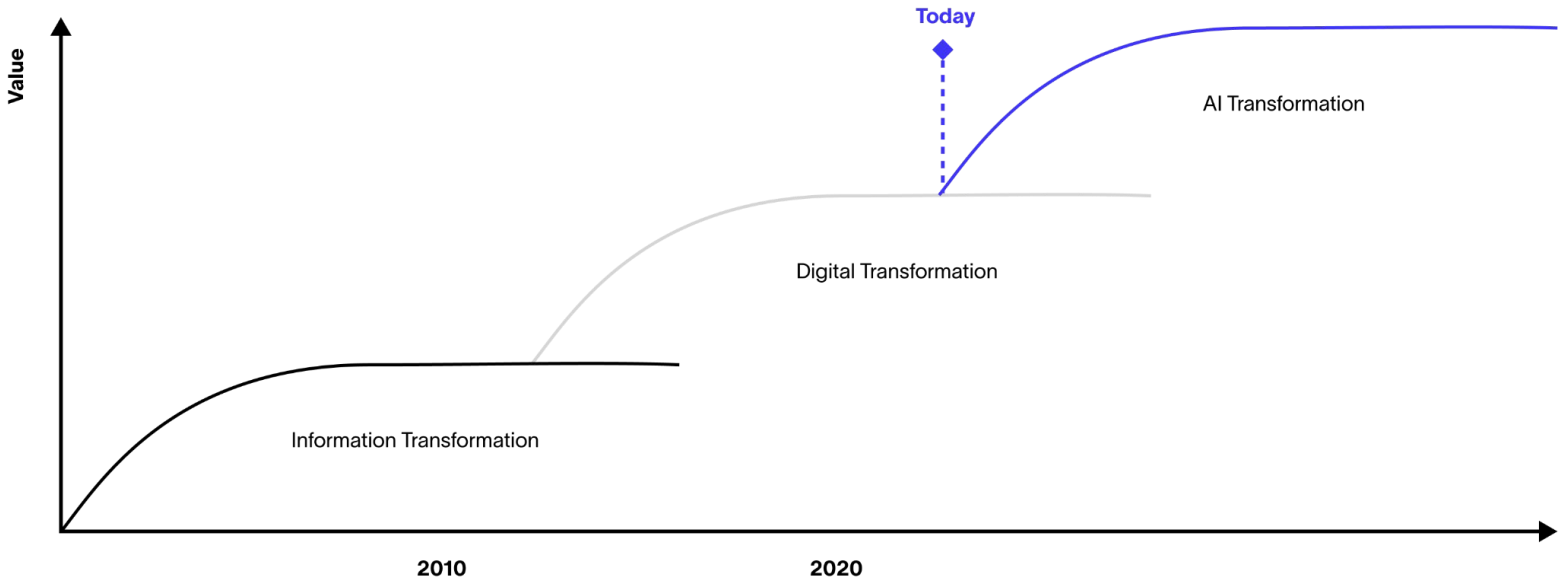
The Foundation: Artificial Intelligence

Artificial Intelligence (AI) uses algorithms, machine learning, and data processing to recognize patterns, make predictions, and adapt to new challenges. It is the driving force behind the next wave of technology.

AI is already being used in various fields, from voice assistants and autonomous vehicles to diagnostic systems and personalized recommendations.



AI Transformation as the Next Stage of Digital Transformation



Source: Inspired by Nils Seebach on LinkedIn

Timeline for the Development of Future AI Systems – Don’t Believe the Hype!

2025–2030

Evolution of current technologies

Technological breakthroughs in machine learning and NLP, growing demand for AI Agents.

- AI Agents
- Emotional AI
- Limited Quantum AI

2030–2040

Transition to new paradigms

Advances in communication technologies and decentralized data processing, alongside ethical and regulatory developments.

- Collective AI
- Biological AI
- Expansion of Quantum AI into new industries

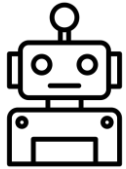
2040 and beyond

The era of Artificial General Intelligence (AGI)

Major advances in algorithms and hardware, societal pressure, and collaboration between key players.

- AGI with human-like intelligence
- Merging of AGI, Quantum AI, Collective AI, and Biological AI

The Evolution of Artificial Intelligence



Artificial Narrow Intelligence (ANI)

Specialized in specific tasks (e.g., language processing, image recognition).

Artificial General Intelligence (AGI)

General intelligence comparable to human thinking capabilities.

Artificial Superintelligence (ASI)

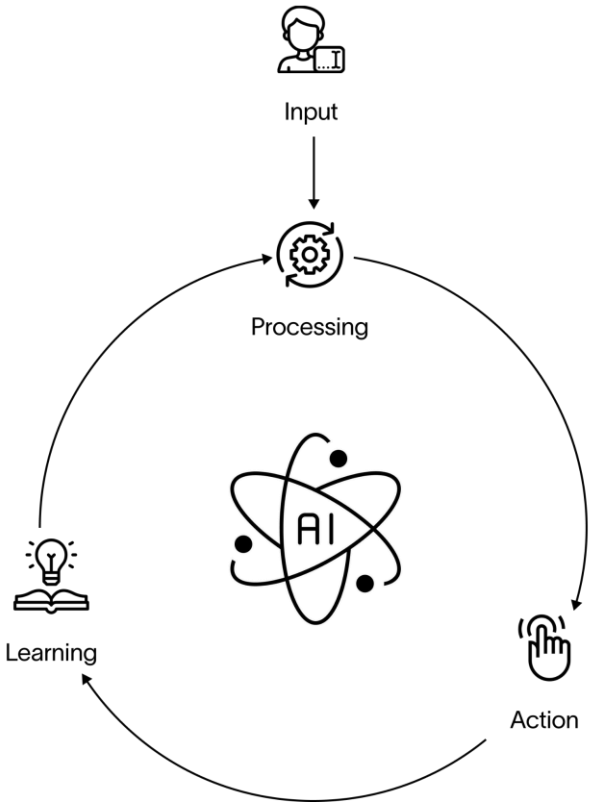
Surpasses human intelligence and abilities in all areas.

Deep Dive
AI Agents

AI Agents

AI Agents are intelligent systems that use artificial intelligence to revolutionize how businesses and individuals interact with technology.

They go beyond predictive systems: Unlike traditional automation tools, which function merely as "co-pilots" or predictive systems, AI Agents are flexible and capable of learning.



Difference Between AI Chatbots and AI Agents

AI Chatbots

Until the end of 2024, AI Chatbots were the most common and everyday form of AI technology.

They are based on Large Language Models (LLMs), are modality-bound, and rely on the user's chat history as memory. Their knowledge is static and limited, making them primarily suitable for short-term, well-defined goals.

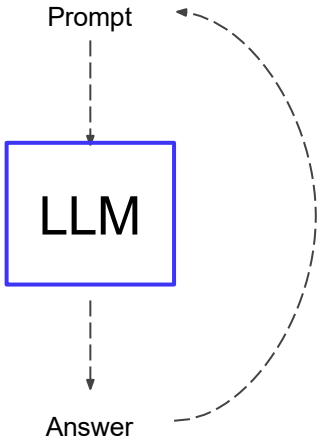
AI Agents

Since late 2024, the first truly powerful AI Agents have been introduced.

AI Agents operate on a dynamic reasoning framework, enrich their knowledge through tool integrations and long-term memory systems, and can make independent decisions. With access to APIs, external data sources, and advanced functionalities, they excel in long-term, complex tasks far beyond the capabilities of traditional chatbots.

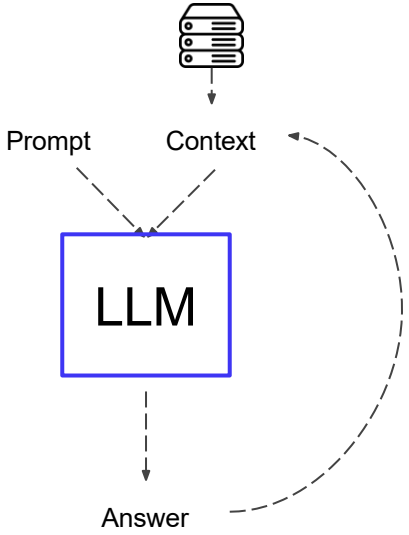
Different ANI AI Models

LLM



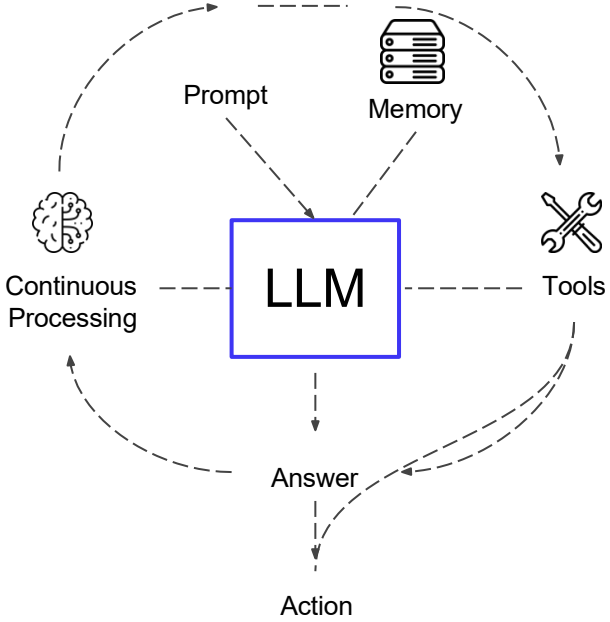
LLM (e.g. ChatGPT)

RAG



Retrieval Augmented Generation
(e.g. Company Chatbot)

AGENT



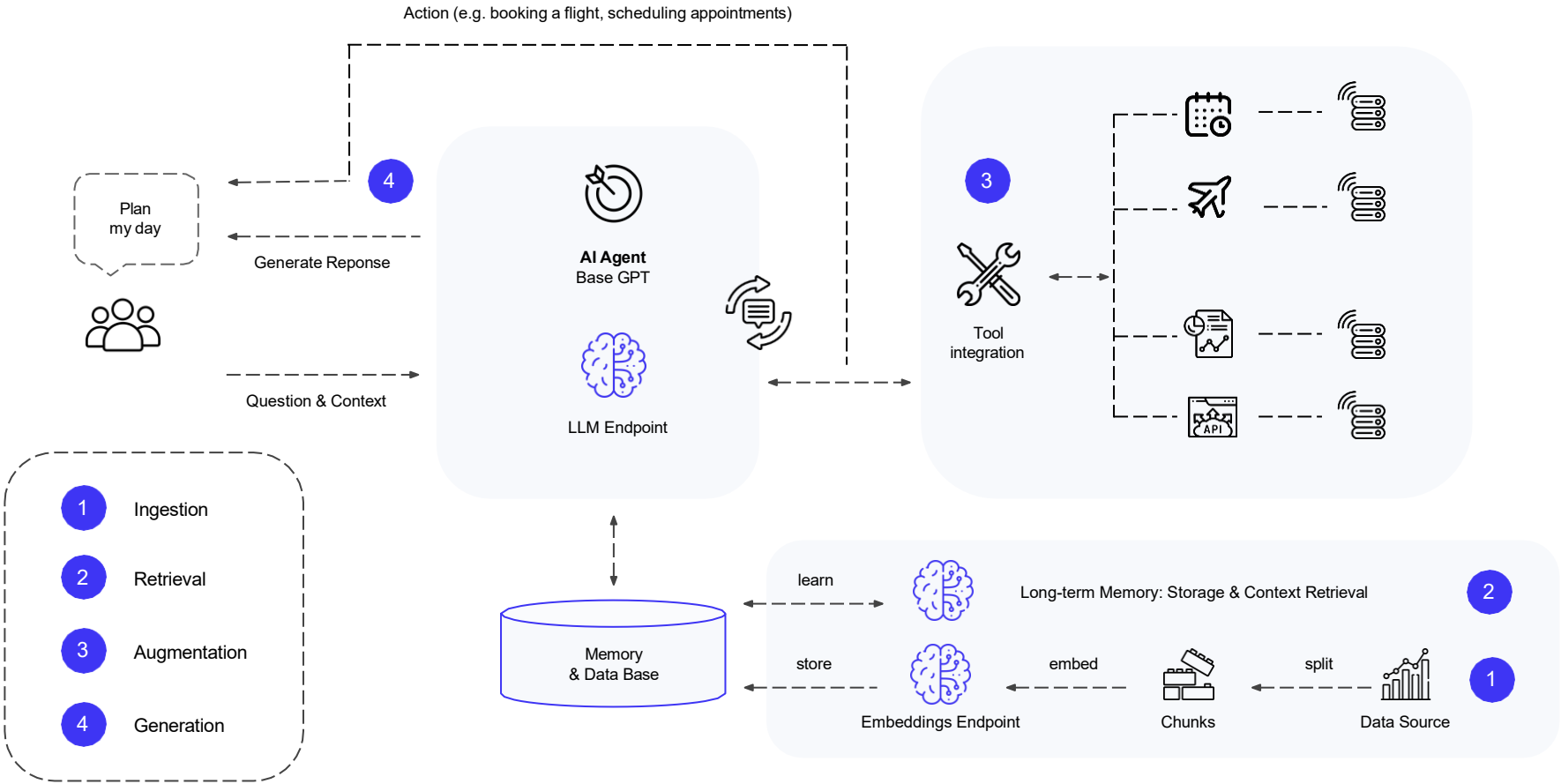
New era: autonomous Systems

AI Agents: Autonomy and Action

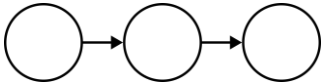
With synthetic intuition and multimodal data processing, they develop a deep understanding of complex contexts and act autonomously based on extensive data analysis. They can independently execute tasks and make real-time decisions.

These abilities make them indispensable tools in today’s fast-paced digital world.

AI Agent Concept



Differences: Automation vs. AI Workflow vs. AI Agents



Aspect	Automation	AI Workflows	AI Agents
Task Type	Deterministic, repetitive tasks	More complex tasks requiring flexibility	Adaptive, dynamic tasks
Strengths	Fast, reliable, easy to implement	Pattern recognition, flexible decision-making, analytical abilities	Can anticipate new scenarios, high autonomy
Weaknesses	No adaptability	Requires well-prepared data	Less reliable, unpredictable results possible
Examples	Email filtering, automated invoicing	Text generation, analysis based on user input	Chatbots with context understanding, adaptive tools for strategy

Most Common AI Agents

Reflex Agent
Direct response to conditions

Reflex agents operate based on simple rules like *"If x, then y"*. They are straightforward, efficient, and ideal for well-defined, predictable tasks. However, their capabilities are limited as they neither pursue long-term goals nor learn from past experiences.

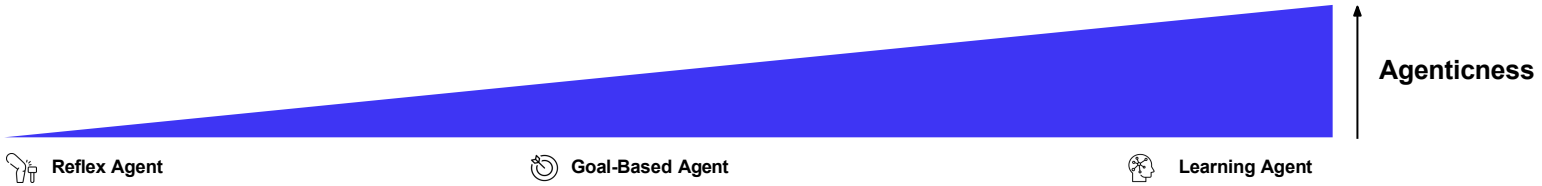
Goal-Based Agent:
Plans actions to achieve a goal

A goal-based agent is designed to pursue a specific objective. It autonomously creates sequences of actions to reach its target. These agents are particularly suited for tasks requiring flexibility and decision-making in dynamic environments.

Learning Agent:
Adapts and improves through experiences

Learning agents take things a step further: they not only follow predefined or self-set goals but also continuously refine their actions through experience. In unknown or changing environments, they gather data, analyze outcomes, and adjust their strategies accordingly.

Stages of Agenticness



Goal Complexity — How challenging and flexible are the objectives?

Environmental Complexity — How dynamic is the environment?

Adaptability — How well does the system adjust to unforeseen situations?

Autonomy — How independently does the system act?

Four Reasons to use AI Agents

Key to Competitiveness & Efficiency

Companies face pressure to automate processes in order to reduce costs and increase efficiency. AI Agents enable the automation of repetitive tasks and the optimization of complex workflows.

Meeting Higher Customer Demands in the Digital Era

AI Agents provide real-time personalized recommendations and 24/7 customer support, leading to higher customer satisfaction and stronger customer loyalty.

Wide Application Areas & Scalability

AI Agents are versatile and can be used across industries, from healthcare to logistics. With intelligent data utilization and cloud computing, projects can scale flexibly, while edge computing minimizes latency.

Regulations & Ethics as the Basis of Trust

The EU AI Act and data protection regulations establish clear guidelines for the use of AI Agents. At the same time, flexible governance models need to be developed to comply with these regulations.

The Use of AI in Companies

Industry-Specific AI Applications

Industry

Optimizes supply chains, minimizes resource use, and increases efficiency.

Healthcare

Assists with diagnostics, therapy planning, and patient management.

Retail

Enhances supply chains and offers round-the-clock virtual assistants.

Education

Supports personalized learning programs and autonomous research agents.

Logistics

Simplifies route optimization, real-time tracking, and warehouse management.

Finance

Enables data-driven decisions and improves financial processes.

Investments in Artificial Intelligence Are Rapidly Increasing Worldwide

Global Market Volume

Projections indicate that the global AI market will reach a volume of over $1.847 trillion by 2030, with an average annual growth rate of 32.9% between 2022 and 2030.

Contribution to GDP

Estimates suggest that by 2030, AI could contribute trillions to global GDP, driving fundamental changes in how we work, innovate, and solve problems.

Investments in the USA

US President Donald Trump announced the "Stargate" project to promote artificial intelligence, with investments of at least $500 billion. This project aims to create over 100,000 jobs and strengthen AI infrastructure in the USA through the construction of massive data centers.

German SMEs

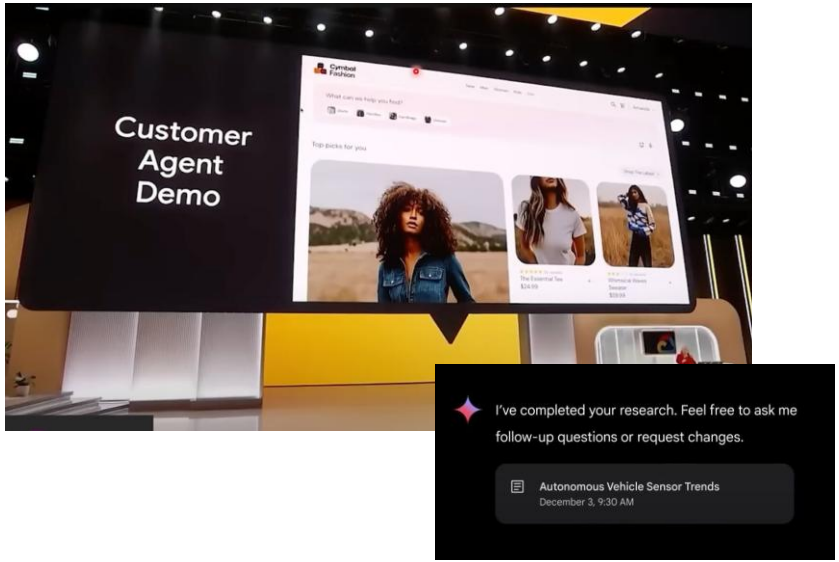
A recent study shows that upper mid-sized companies in Germany have high hopes for AI. 54% of respondents expect to increase their budgets for AI projects by up to 25%.

Source: (1) produktion.de (2) investmentweek.com (3) welt.de (4) Avanade Trendlines: AI Value Report 2025

An AI Agent in your company?

Many companies can benefit from integrating artificial intelligence. However, choosing the right AI system depends entirely on the company's specific needs and processes.

Multi-level agent systems only become truly beneficial when simpler solutions have reached their limits. For this reason, a strategic AI consultation is worthwhile to identify what the company needs and what can realistically be implemented.



Source: Demo Google's Customer Agent

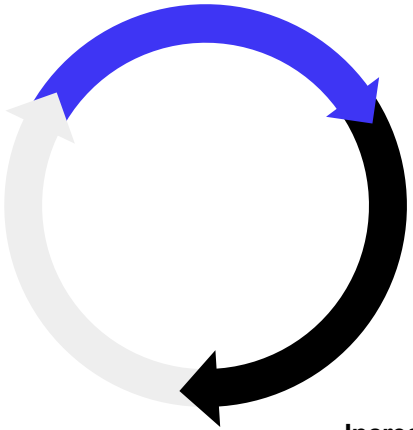
Properly integrating AI into your Business

Before companies can effectively deploy AI Agents, they must first ensure that artificial intelligence is seamlessly integrated into their processes.

By taking the right steps, businesses can ensure that AI Agents operate efficiently and sustainably, maximizing their benefits while minimizing risks.

Building AI Competence

Through targeted and mandatory training and access to AI experts



Identifying Use Cases

With greater competence and acceptance, the number of use cases increases

Increasing Acceptance

Through positive examples, awareness-raising, and compelling arguments

Measures to optimize your Business

Area / Prerequisite	Measure
Goals and Areas of Application	Analyze needs and develop an AI strategy
Data and Infrastructure	Ensure data quality and build scalable infrastructure
Integration into Existing Processes and Systems	Seamlessly integrate AI Agents into systems and utilize flexible APIs
Involve and Train Employees	Conduct training sessions and foster acceptance
Monitoring and Optimization	Implement monitoring systems and continuously optimize
Legal and Ethical Compliance	Ensure compliance and establish ethical standards
Partnerships & Pilot Projects	Collaborate with technology providers and launch pilot projects
Plan for Scalability and Further Development	Promote an innovation culture and anticipate future developments