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Rethinking industrial services with generative AI

Findings and report of the joint survey by the University of St. Gallen and Cognizant

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Executive summary

The rapid advancement of generative Artificial Intelligence (gen AI) is reshaping services by offering novel ways to enhance efficiency, innovation and competitiveness. This joint survey by the University of St. Gallen and Cognizant highlights the transformative potential of gen AI within the industrial services sector, where its integration is currently in nascent stages.

Key insights

Adoption status
While a small fraction of industry leaders has significantly integrated gen AI, approximately 20% of firms have yet to begin their journey

Lacking impact
Only 25% of high-priority use cases are in the early stages of adoption

Future trajectory
Companies predict a substantial increase in the role of gen AI within their operations

Strategic focus
Leading firms distinguish themselves through a strong emphasis on collaborative innovation and procedural enhancements aimed at boosting market performance

Recommendations for industrial services executives

Accelerate gen AI implementation
For firms that have not yet started, it is crucial to initiate pilot projects to explore gen AI's potential benefits tailored to their specific operational needs as well as overcoming gaps regarding data and HR

Enhance collaboration and innovation
Building partnerships can provide access to shared expertise, technology and insights, thereby speeding up gen AI adoption and integration

Focus on innovation
Implement gen AI with a focus on innovation and process improvement to become more efficient than your competitors and more attractive to your customers

Prioritize high-impact use cases
Focus on deploying gen AI in areas such as automation, knowledge management and support functions to quickly realize improvements in efficiency and service quality

Introduction

Generative AI (gen AI) is gaining widespread attention, accelerated by the increasing capabilities and rapid adoption of large language models such as ChatGPT, Gemini and others. Recent studies estimate the impact on the manufacturing industry to be high[1].

To guide managers and senior experts in navigating this landscape, the Institute of Technology Management at the University of St. Gallen and Cognizant have collaborated on a joint survey targeting industrial service professionals to shed light on the following objectives:

1. Understanding the current status of gen AI in industrial companies and services
2. Exploring the landscape of use cases for gen AI-based industrial services (gen AI-IS) and the respective technical and organizational requirements
3. Identifying prioritized areas of application, specifically tailored to industrial services

To achieve this, the survey was divided into five different topics to get an overview on gen AI in industrial services:

I
The maturity level regarding data, infrastructure, HR and experience

II
The vision of companies, their strategic goals and expectations

III
Collaborations and partnerships

IV
Areas in which firms currently pursue use cases

V
Characterization of the highly prioritized use cases

The survey was completed in March and April 2024 by professionals from a variety of industries, such as automation and robotics, engineering and manufacturing, packaging, energy and power, and others, including individuals in positions such as CIOs, global service directors, heads of R&D, product management, innovation, etc. A total of 54 respondents from 40 different companies participated in the survey.

Figure 1: Selection of participating companies

1 McKinsey & Company. (2023). The economic potential of generative AI: The next productivity frontier. McKinsey & Company. Retrieved May 30, 2024

Maturity dimensions and classes

The maturity of the survey participants is based on five areas:

01 **Data**

02 **HR**

03 **IT infrastructure**

04 **Level of gen AI-integrations**

05 **Experience**

Based on each area, a maturity index was defined. Furthermore, different risk dimensions are inspected.

Status of data, HR and IT infrastructure in relation to gen AI

To assess the maturity level of the different companies, the first three different areas were analyzed. Three questions cover the area of data (D1-D3), four questions cover the readiness of human resources (HR1-HR4) and three questions cover the IT infrastructure (IT1-IT3). Figure 2 shows that more than 50% of the companies lack competent developers and sufficient knowledge. While the companies' own technology infrastructure is relatively ready, the customers' infrastructure lags behind.

To which degree do you agree with the following statements?

Figure 2: Maturity level

Company experience and level of gen AI integration

As most companies have only been exploring or implementing gen AI for a year, the level of integration is also rather low. Around 60% are in the early stage of adoption, while 25% of participants do not yet use gen AI.

When did your company first start exploring or implementing GenAI-IS?

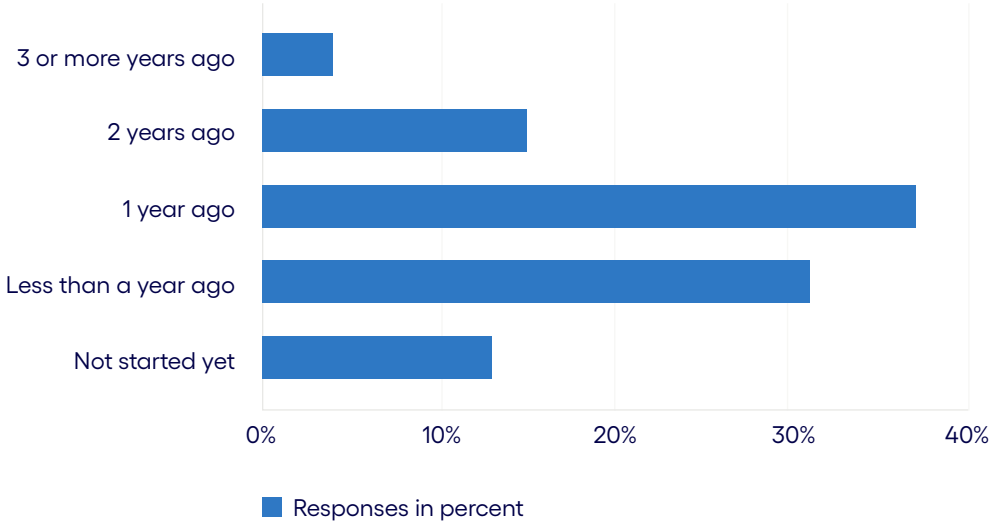


Figure 3: Experience

How extensively is GenAI integrated into your daily operations?

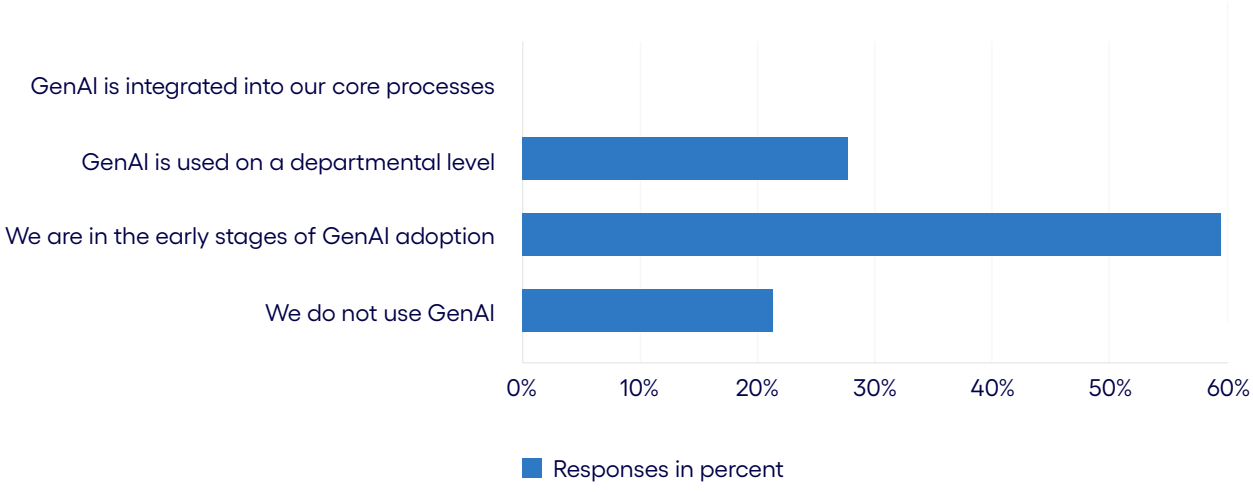


Figure 4: Integration level

Emerging risks for companies in connection with gen AI

In the context of gen AI, companies were asked whether they recognized risks in the areas of data security, IP protection, ethical aspects and regulatory aspects. Overall, the risk of genAI was categorized as rather high. This is particularly true in the areas of data security and IP protection, and model reliability, where more than 70% of respondents see a risk. Some individual respondents identified AI as a threat due to the risk of making human work obsolete.

In the context of developing and implementing GenAI-IS, which significant risks are you presently addressing?

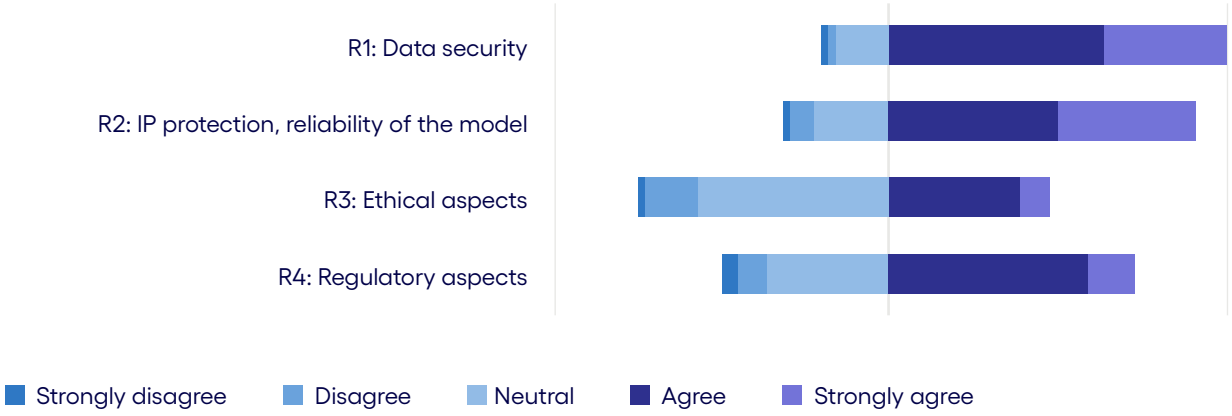


Figure 5: Risks

Definition and scoring of the maturity index

In order to be able to further investigate the current status of the companies and to differentiate between the maturity of the firms, a maturity score was implemented. The scores are based on twelve maturity questions from above:

Maturity dimensions	Number of questions	Weighting of each question
Data	3	1X
Human resources	4	1X
IT infrastructure	3	1X
Experience	1	2X
Integration	1	3X

Table 1: Maturity index dimensions

The points were awarded according to the principle that those with a low degree of maturity receive 0 points and those with a high degree of maturity receive 4 points. This leads to a maximum score of 60 being achievable. The questions on risk were excluded, as the more mature companies generally face more risks, which mainly arise during implementation and are therefore underestimated by lagging companies. The companies were then divided into four maturity classes based on their score:

Category	Range	Average value	Number	Percentage
Leader	40-60	49	5	10%
Ascender	30-39	33	18	34%
Explorer	20-29	26	15	28%
Lagger	0-19	16	15	28%

Table 2: Maturity index distribution

It should also be noted that a further knockout criterion was implemented: If a company does not use any gen AI in their daily operations, they were automatically classified as laggers.

The different classes differ as follows:

1 **Leader vs. Ascender**:
Leaders are more mature in terms of experience, level of integration and infrastructure. Leaders are also slightly better in terms of HR, with almost no difference in terms of data.

2 **Ascender vs. Explorer**:
Both are equal in terms of integration, but there are significant differences regarding data, with Ascenders being slightly more mature in the other aspects.

3 **Explorer vs. Lagger**:
There are similarities in terms of data, HR and infrastructure. However, the Explorers are one step ahead in terms of integration, which is directly related to their experience.

Maturity performance across groups

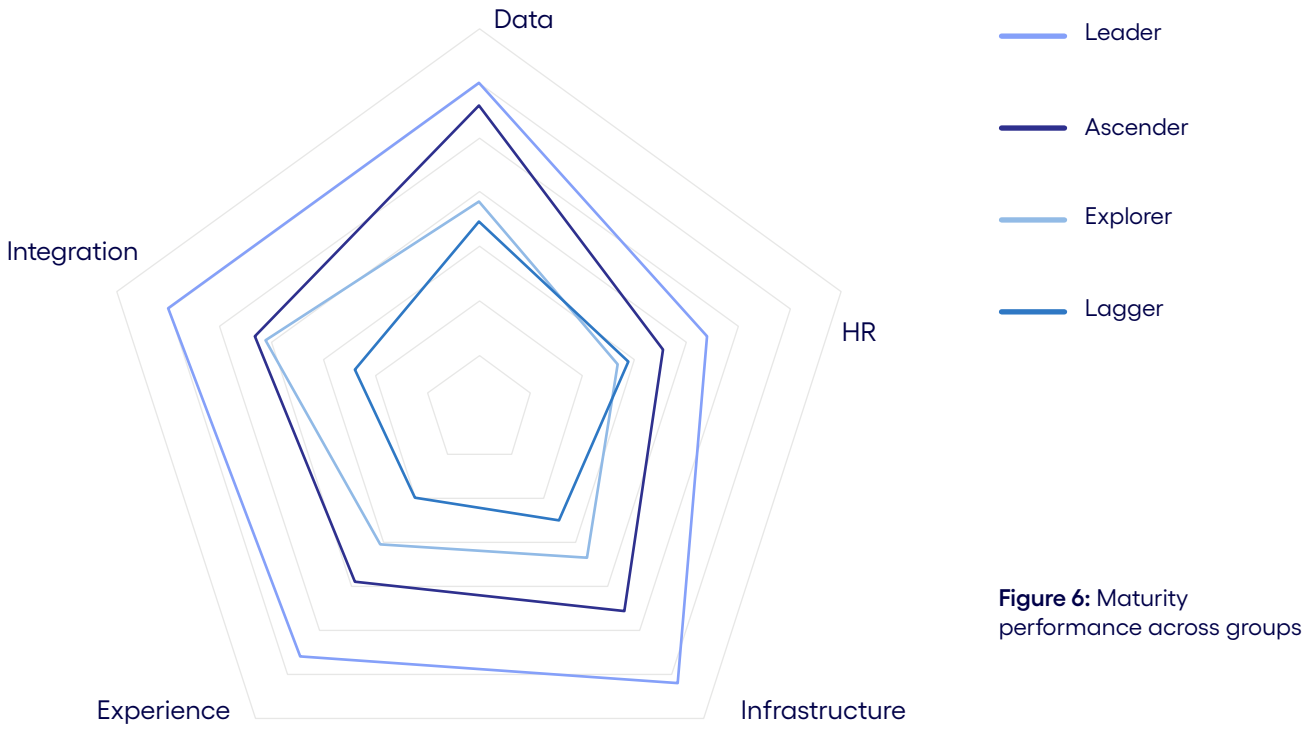


Figure 6: Maturity performance across groups

Expectations and value analysis

The value analysis covers the mission, the primary motivation, the future presence of gen AI and the expected business performance.

Gen AI's corporate mission and vision

Survey participants were asked to name their overall vision for implementing gen AI in the context of industrial services. Collectively, the vision statements emphasize the integration of generative AI into industrial services to increase operational efficiency, improve customer experience and drive innovation through the strategic use of data. Companies aim to leverage AI not only to streamline processes and increase productivity, but also to maintain competitive advantage and deepen customer engagement.

The vision statement can be clustered into the five following types:

Enhancing efficiency and productivity

Leveraging AI to enhance operational efficiency and productivity across various functions.

> To drive the next wave of industrial innovation by integrating cutting-edge AI technologies that transform traditional operations, manufacturing and services, making them more adaptive, efficient and sustainable

Data utilization and innovation

Utilizing data for predictive analytics, decision making and generating innovative solutions to meet daily operational challenges.

> We are currently working with predictive AI to make forecasts based on past moments. So, we hope that gen AI can be used to generate innovative ideas or predictions to help solve day-to-day problems

Strategic vision and leadership in AI integration

Broad strategic vision for integrating AI to ensure industry leadership and adapt to emerging technological trends.

> World market leader, technology leader and innovation leader in our industry. Increase customer service business with digital services by utilizing the latest technologies

Customer and market focus

Improving customer experiences, services and maintaining competitiveness in the global market through AI innovations.

> Improved customer relations: Our focus on shared success and collaborative partnerships strengthens customer relationships, fostering trust, loyalty and longterm satisfaction. By aligning our goals with those of our customers and leveraging the power of AI, we not only optimize business outcomes but also cultivate enduring partnerships built on trust, innovation and mutual prosperity

Integrating AI for specialized solutions

Application of AI to develop specialized tools and solutions tailored to specific industrial needs.

> From an R&D perspective, generative AI could support us to enhance efficiency, safety, reliability and sustainability in urban infrastructure. Key topics include digital transformation for improved cross-industrial collaboration, predictive maintenance and personalized solutions to optimize user experience

Comparison of different integration motivations

For 68%, the main motivation for integrating GenAI is to be a leader in innovation and strategic planning for the future. In addition, more than half of them are looking for process improvements and resource savings. Figure 8 also shows that there is currently no regulatory or compliance pressure and little competitive pressure. At present, only 35% are experiencing customer demand or expectations.

Which of the following best describes your primary motivation for adopting GenAI-IS?

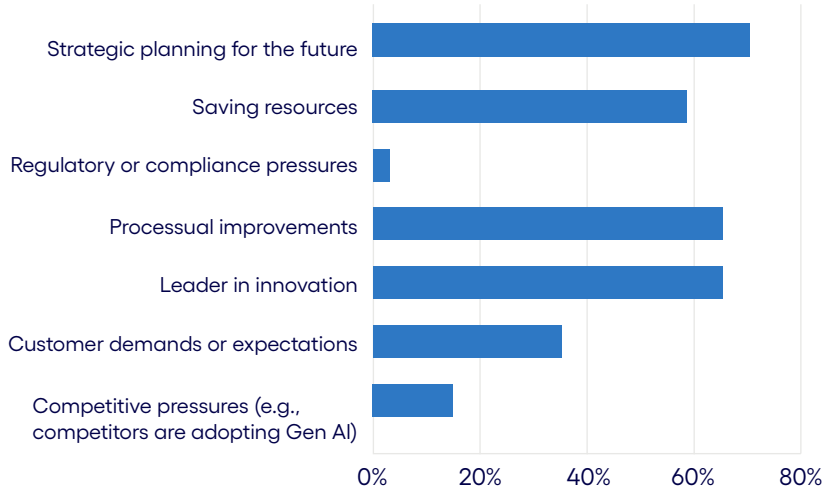


Figure 8: Primary motivation

The future presence of gen AI in the industry

Around half of respondents perceive the future presence of gen AI within their company to be either significant or omnipresent, while only 10% expect a minimal influence, and no one expects no influence in their company and industry. Interestingly, companies believe that gen AI holds a stronger presence within their operations compared to their industry, possibly driven by a perception of being industry leaders.

What presence do you think GenAI-IS will have in the next 3 years...

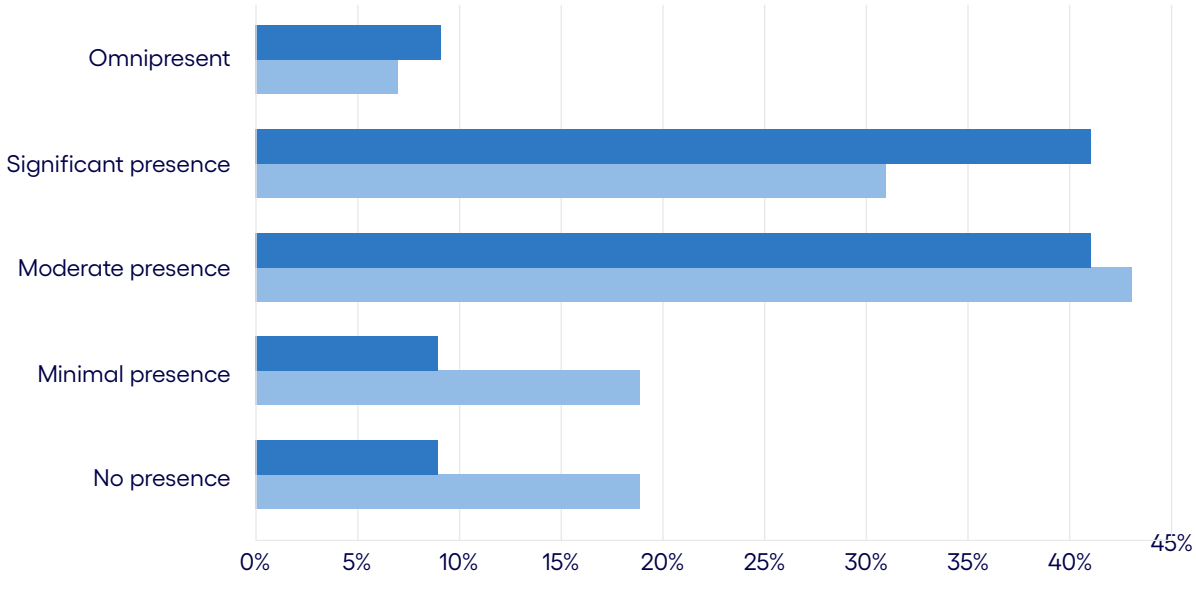


Figure 9: Expected presence

Firm performance expectations from integration

Analyzing companies' expectations of their firm performance compared to their competitors reveals that, in terms of operational performance, 68% expect their productivity to exceed that of their competitors. They do not expect their profit, ROI and sales revenue to increase as much in comparison. In terms of market performance, 66% expect to launch new products faster and 58% expect the success rate of new products or services to be higher. About half want their market share to increase.

To which degree do you agree with the following statements?

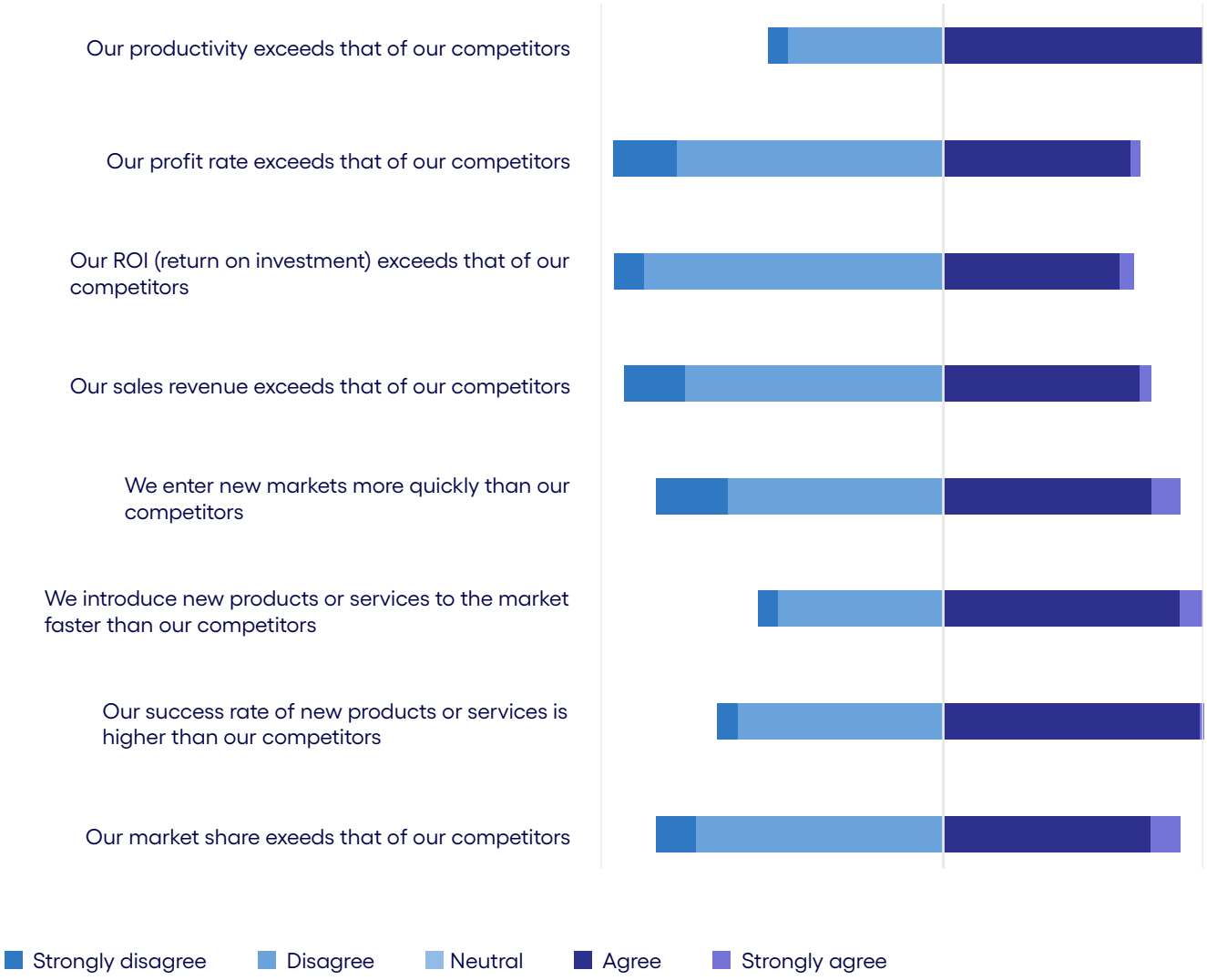


Figure 10: Firm performance expectations.

Leaders' vision compared to non-leaders

The survey examines what leading companies do differently from non-leading companies regarding the gen AI-IS motivation.

Motivation

Leaders are adopting gen AI-IS to strive for innovation leadership and process improvement. On the other hand, the primary motivation for adopting gen AI-IS among non-leaders is to prioritize strategic planning for the future.

Presence

Leaders expect a significant presence of gen AI-IS in their own operations, but also in their industry, whereas non-leaders anticipate a moderate presence.

Expectations

Leaders have high expectations for the impact of gen AI-IS on market performance (e.g. market entry, product/service launch and product success rates) and are aiming for significant improvements there, while operational performance (e.g. profit rate, ROI, sales revenue) is rather secondary compared to non-leaders who hope to gain a competitive advantage through operational performance.

Role of partnerships

The types of partnership as well as their relevance was determined. Differences between leaders and non-leaders were inspected.

Partnerships in general

Only about 10% of companies collaborate with their customers, and only 20% share information. The rest, 70%, manage their gen AI projects internally. Partnerships with other companies (non-customers) are more common, with 36% of respondents collaborating with other companies and 32% saying that other companies are relevant for more than a quarter of their development.

Do you collaborate on Generative AI-based industrial services projects or shared research with...

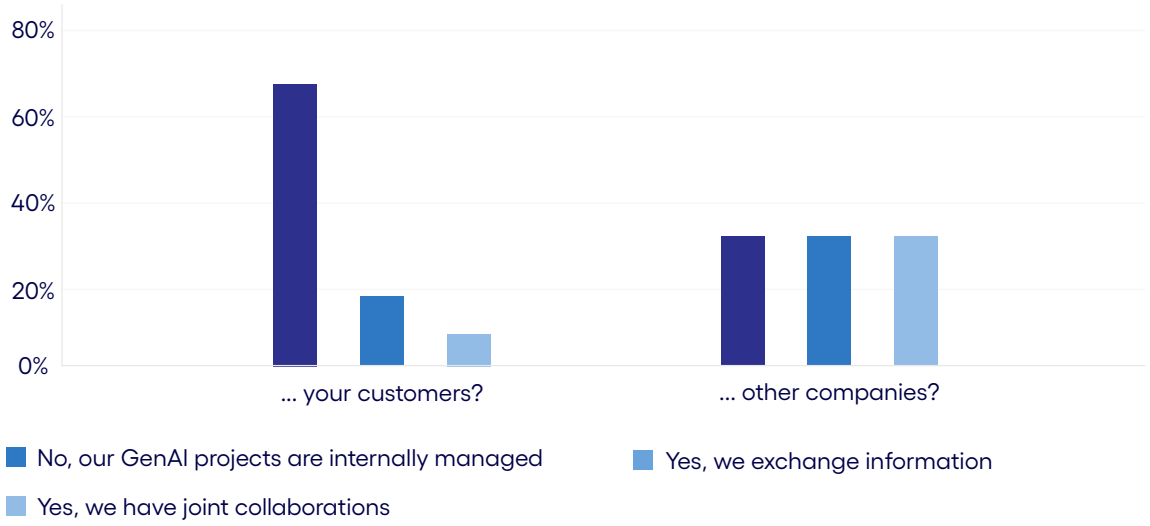


Figure 11: Degree of collaboration with customers and other partner companies on GenAI initiatives

Please outline the relevance in the development of GenAI-IS of...

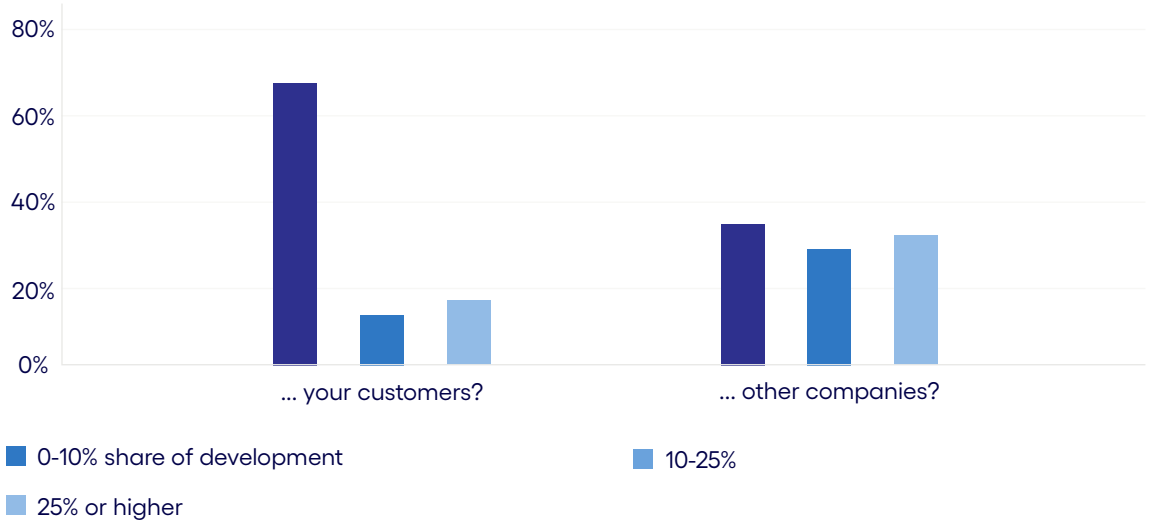


Figure 12: Share of development with customers and other partner companies on GenAI initiative

Comparing leaders and non-leaders

Regarding partnerships, leaders actively seek collaborations with other companies and exchange information with their customers, while non-leaders are more cautious and only rarely exchange information with other companies and hardly involve customers at all.

Use case description and clusters

For the use cases, a longlist was first used to determine which use cases are commonly pursued in the company . In a second step, respondents were asked to define their high-priority use case. This is the use case that has either already been implemented or is closest to being implemented.

Use case general

Looking at the use cases that are currently being pursued in companies, most companies have multiple use cases in different areas. The most common use cases are in service operations. More than half of the respondents say they are developing a use case that includes a customer support chatbot, language translator and interpreter, and a service virtual assistant. In addition, product chatbots and customer service analytics were also frequently mentioned. A second area with many use cases is product and/or service development. The focus here is mainly on digital twins of customers—dynamic product development and custom products or solutions. There are also many use cases in manufacturing, such as document search and synthesis or process optimization. Another area with increasing use cases is marketing and sales, especially content generation and specialization.

Use case area	Use case type	Distribution
Service operations	Language translator/interpreter	61%
	Customer support chatbots	57%
	Virtual assistants for service	49%
	Chatbot for products and offerings	45%
	Customer service analytics	43%
Product development	Digital twin development	43%
Manufacturing	Document search and synthesis	47%
	Process optimization	45%
Marketing and sales	Content generator/personalizer	43%

Table 3: Overview and distribution of Uue case areas and types that are pursued by the service divisions of the participating companies

High-priority use Cases

Each use case was labeled and briefly described. Based on this information, a word cloud was created which shows the most common words in order to obtain an overview of the use cases.

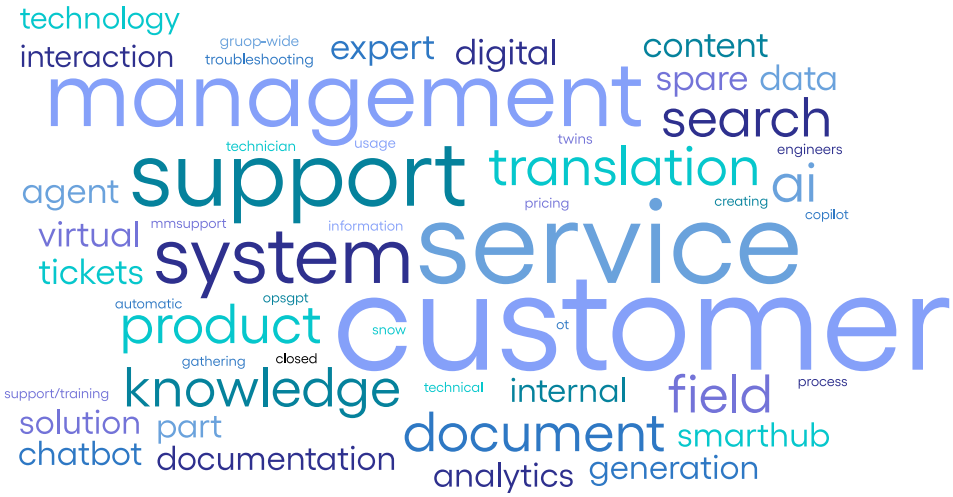


Figure 13: Title word-cloud made from the high-priority use cases

“Customer” is the most frequently mentioned term, but this does not mean that the use cases should be directed towards the customer. Instead, the term “customer” is used in the context of analysis, segmentation, tickets and interaction. The use cases should therefore support the interaction and analysis of the customer in the service.

The term “management” also stands out, but the survey participants put it in the context of knowledge, documents, data and services. Knowledge management therefore plays an important role here again, but also the organization and provision of services.

The prioritized use cases of gen AI-IS can be divided into five different clusters, each with unique focuses and examples:

Use case cluster	Definition	Example
Enhanced support systems	Quick responses to inquiries, troubleshooting support, and documentation retrieval.	Customer support chatbot: Provide information, order the right parts and improve user experience.
Efficiency and automation in operations	Automate routine tasks, optimize manuf. systems and better resource allocation.	Virtual engineering assistant: Engineer production machines and lines, e.g., by PLC code generation.
Predictive and proactive solutions	Predict outcomes, preemptively solve problems and optimize processes.	Predictive maintenance: Improve data analytics outcomes to better predict failures of machinery.
Customer and market insight generation	Making informed business decisions and strategizing based on customer data.	Customer segmentation: Based on various sources (e.g., CRM system, purchase history, website analytics and customer interactions).
Knowledge management (KM)	Managing and utilizing vast amounts of data and knowledge across platforms and services	KM for field services support: Internal technical KM and self-service support for end customers

Figure 14: Use case clusters based on the prioritized use cases named by the survey participants.

The exact use cases and their descriptions can be found in the Appendix. The use case clusters and associated use cases are those defined by the survey participants. This does not mean that these are appropriate gen AI use cases. Rather, it can be expected that for some use cases, the best technology to facilitate the use case will not be gen AI, e.g., classical machine learning models (regression, decision trees, SVM, KNN), RPA, data management and business intelligence, etc.

Looking more closely at the implementation stage of the prioritized use cases in Figure 15, most companies are still in the early stages. Only a quarter have started implementation, while the rest are either exploring options or preparing for implementation. The most common use cases involve small amounts of labeled data from historical documents. The main challenges are data quality issues and a lack of skilled workers. There are no significant challenges related to integrating generative AI into business strategies. The use cases are designed to be replicable across different departments and functions. The results show that hardly any companies currently use KPIs to measure their success, while the average expected ROI for the most promising use cases is around two years.

What is the current stage of implementation of your use case?

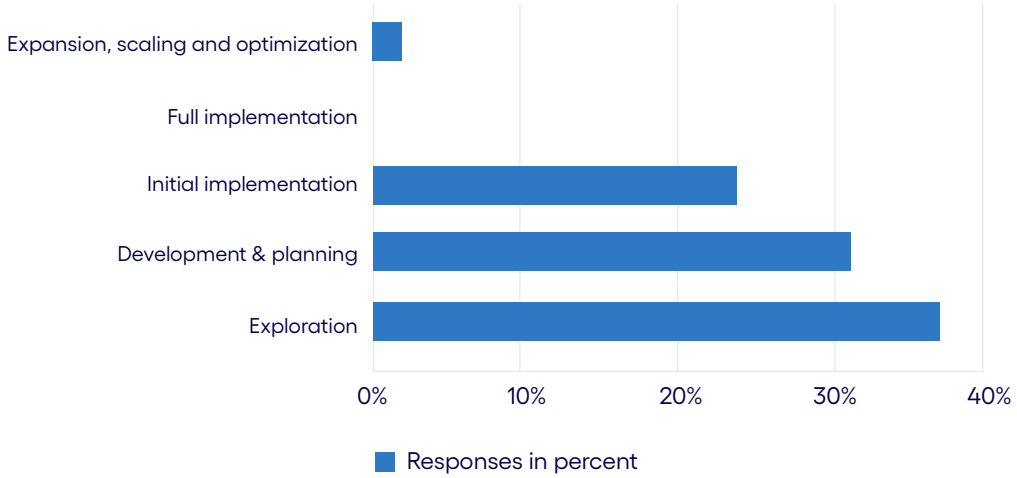
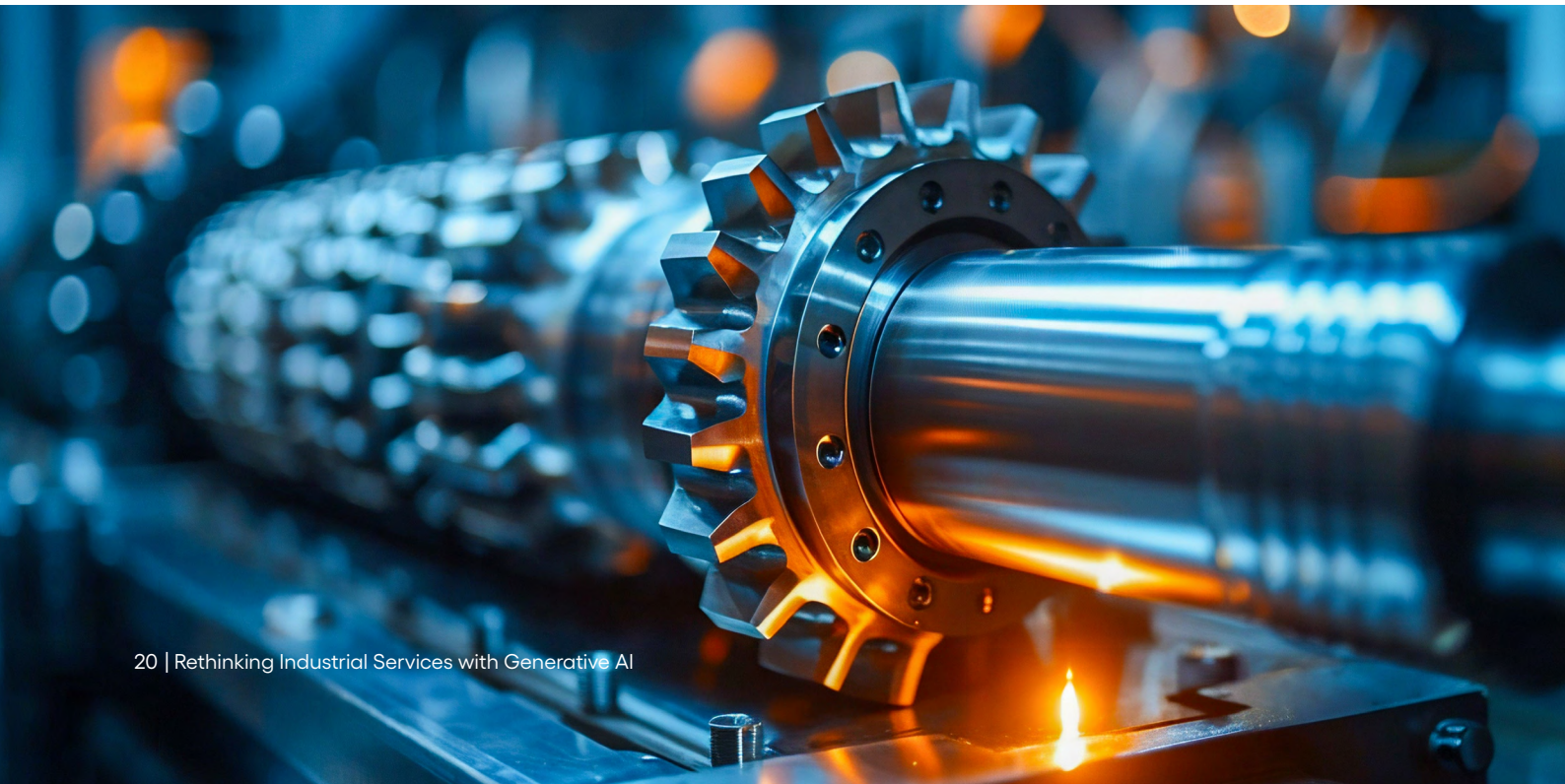


Figure 15: The implementation stage of the prioritized use cases



Summary

Our survey reveals the nascent but promising integration of generative Artificial Intelligence (en AI) within the industrial services sector. As it stands, the application of gen AI is relatively nascent with a significant variance in maturity across companies:

Current integration of gen AI

While a minority of leaders excel, most companies remain either explorers or are just beginning to engage with gen AI technologies

Adoption rate

80% of surveyed companies have already initiated the use of gen AI in a general manner, but only 25% are already implementing their prioritized use case

Future expectations

Companies anticipate a greater role for gen AI in their operations relative to the wider industry, suggesting a push towards becoming early adopters to gain competitive advantages

Maturity diversity

This diversity supports the classification of companies into distinct groups such as leaders and explorers, based on their integration of and experience with gen AI

Strategic priorities

Leaders in the space focus heavily on collaboration, innovation, and procedural improvements to drive market performance, thus gaining a competitive advantage

Use cases

The adoption is mostly seen in supporting functions, automation and knowledge management

Implications and recommendations

The findings underscore a critical period in the industrial services sector where early adoption can significantly influence future competitiveness. Companies lagging in adoption risk falling behind not only in terms of technological capabilities but also in market positioning. Thus, it is imperative for businesses to:

Accelerate gen AI implementation

For firms that have not yet started, it is crucial to initiate pilot projects to explore gen AI's potential benefits tailored to their specific operational needs tailored to their specific operational needs

Focus on innovation

Implement gen AI with a focus on innovation and processual improvement, by means of which you become more efficient than your competitors and more attractive to your customers

Enhance collaboration and innovation

Building partnerships can provide access to shared expertise, technology and innovative practices, thereby speeding up gen AI adoption and integration

Prioritize high-impact use cases

Focus on deploying gen AI in areas such as automation, knowledge management and support functions to quickly realize improvements in efficiency and service quality

As gen AI technologies evolve, their impact on industrial services is expected to deepen, making their integration into everyday business operations critical. Addressing the barriers to adoption, such as data quality issues and skills shortages, will be critical for companies looking to fully capitalize on gen AI technologies. By embracing these technologies, companies can not only improve their operational efficiency, but also drive significant innovation, ultimately leading to sustainable competitive advantage in the rapidly evolving industrial services market.

Appendix

High-prioritized use cases

Use case cluster	Use case title	Description
1. Enhanced support systems	OT virtual agent	Customer support management (CSM) efficiency improvements and customer satisfaction improvements.
	Chatbot for internal and external support	AI chatbot implemented for a support department, to be used by employees. The chatbot will be answering queries related to internal process documentation.
	Process expert system	Aim is to structure an expert system for process troubleshooting.
	Service expert system	Capture and provide service knowledge.
	Automatic translation services	Saving resources and building knowledge.
	Customer tickets in service management system	Employees in customer service receive a complete translation plus a proposal for an answer to service tickets from customers globally.
	OpsGPT	Generally, this needs to be further defined. However, the basic idea is to support our customer operations team in responding faster and more accurately to customer requests.
	SNOW closed tickets	Identify which service desk tickets gets incorrectly closed, leaving the user with the problem.
	Enhanced customer support chat	Availability and better response time.
	Digital support gent	Providing first-level technical support on systems.
	Chatbot	Find technical documentation and resolution pathways.

Use case cluster	Use case title	Description
2. Knowledge management and integration	Knowledge management for field services	Internal technical knowledge management and self-service support for end customers and partners.
	Internal usage of AI for customer support and technician support/ training	Provide a central KM system for the vast product portfolio we have to deal with in Service - also dating back 40 years of product generations - several hundred thousand different products.
	Knowledge management for R&D	From an R&D perspective, gen AI-IS lends itself to streamline our knowledge management, improving collaboration across different departments and hence reducing development time.
	Document search	Enable service staff to chat with service documentation (service manuals, information updates, installation manuals, knowledge Articles of field service techs, etc.) and get response in any language.
	Group-wide knowledge bot	First use case that comes to my mind is getting answers on how to enter vacation days, do invoicing or any information on a topic of interest based on harvesting all content from Corp. Learning, intranet, Jira, Mingle and Teams.
	SmartHub and SmartHub Orbit	Offer a internal and external platform to collect instrument data and share knowledge to our internal staff but also made it available for our customers as far it made sense.
	Internal AI chatbot	AI chatbot implemented for a support department to be used by employees. The chatbot will be answering queries related to internal process documentation.
	A. Knowledge management for field service B. Spare parts web shop	A. Increase efficiency of finding information B. Support customers to order the right parts and improve user experience.

Use case cluster	Use case title	Description
3. Predictive and poactive solutions	Predictive maintenance for heavy machinery	Improve data analytics outcomes to better predict failures of the heavy machinery.
	Advanced product quality data analytics Q 4.0	Proposing problem solutions based on historical data, documents, crowd knowledge and realtime monitoring. Beyond that, recognizing potential quality problem fields before they become obvious and have major cost impact.
	Specification wizard for custom solutions	Extract information from specifications; custom implementation.
	Predictive life sciences manufacturing system integration projects	Create and deliver the same value proposition for onshore engagements with a considerably lower cost by making onshore resources and services more efficient.
	Automated inspection (not yet started)	To use IA to support Inspectors to do incoming and final component inspection.
4. Efficiency and automation in operations	Optimization of sales	Focusing the work of salespeople to high-level contacts by automatization of simple work and analytics trough AI.
	Automatic translation services	Saving resources and building knowledge.
	Optimizing life sciences manufacturing system integration	Train and use a gen AI model with all our available value propositions for every single service. The gen AI model can create new and optimized value propositions for every service we provide, learning from all the solutions provided in the past.
	Construction management analytics and insights	To combine different types of enterprise and project data residing in different software solutions to deliver insights and recommendations that help our customers increase productivity, safety and sustainability.
	Fiber-optic expansion as a turnkey solution	Each city has its own requirements. Requirements for submission and authorization (application forms, different offices, different requirements in the inner city, different processing procedures and processing times from application to approval). If we get this AI use case implemented, it means a dramatic improvement in the overall process.

Use case cluster	Use case title	Description
	Technology search	Understand the state-of-the art in different areas related to our technologies.
	Printing technology	AI to recommend the preferred printing technology for new designs.
	Virtual engineering assistant	Helping customers to engineer production machines and lines, e.g., by PLC code generation.
	Inland transport ETA/ Customer interaction/ Point-of-interest-identification	Increase quality of ETA-prediction based on collection of end-route insights and customer perspective—save time, kilometres and CO2 and at the same time improve customer satisfaction.
	Spare part pricing	To detect the market price level per country to price our parts in a competitive way.
	Process expert system	Aim is to structure an expert system for process troubleshooting.
5. Customer and market insight generation	Customer segmentation	Gather data from various sources such as CRM systems, social media, purchase history, website analytics and customer interactions.
	Competitive positioning of solutions	Internal tool only. Helping salespeople to understand competitive positioning of our solutions vs. the main competitors for different segments and stakeholder groups.
	Customer and installation complaint analysis	Learning and deriving product improvements from customer and installation feedback.
	Texting different strategy and product management documents	To describe services, campaigns, products with help of AI the most powerful way.
	Content generation and editing. Content translation.	Customer-facing content localization.
	Exploring possibilities	Introducing new service products.
	Product documentation intelligent search/ document generation	Empower R&D engineers to have easier way to retrieve product documentation for our document repositories and generate new documents more efficiently.

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