Lernende Systeme

GERMANY'S PLATFORM FOR ARTIFICIAL INTELLIGENCE

Creating Value(s) with AI

White Paper

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WG Innovation, Business Models and Processes

Executive Summary

Artificial Intelligence (AI) holds immense potential to generate value by fulfilling its value proposition. Successfully integrating AI into businesses, particularly small and medium-sized enterprises (SMEs), requires addressing both its opportunities and challenges. Four key aspects are crucial for successful adoption. First, building interdisciplinary collaboration is essential to combine technological expertise with business acumen, fostering innovation and problem-solving. Second, it is important to identify and implement concrete use cases that deliver genuine value and measurable impact. Third, clear communication of AI's benefits ensures that stakeholders and users understand its practical advantages and the added value it brings. Fourth, providing transparency regarding the prerequisites for each use case, including data, expertise, and infrastructure, is vital to establish trust and enable informed decision-making. By focusing on these aspects, AI can gain widespread adoption and create significant value across diverse sectors, including Industry 4.0, future mobility, digital government, education, and research.

Where traditional technologies reach their limits, AI emerges as a transformative force, enabling entirely new applications across various industries. It empowers companies to enhance operational efficiency, improve products and services, and even develop new business models. In the pharmaceutical industry, for example, AI accelerates the development of new drugs, while in manufacturing, it reduces machine downtime and minimizes

defective output, significantly improving product quality and resource efficiency. The positive impact of AI extends not only to product quality but also to employee workflows and customer satisfaction. Yet, the question remains how to scale AI adoption to unlock its full potential and deliver on its value proposition across industries.

AI Value Proposition: Creating Value(s)

The adoption of AI and its inherent potential opens entirely new possibilities for companies to shape their business models, products, and services. At the same time, the use of AI drives changes that, in turn, further evolve the business model itself. In this way, AI deployment generates value across various dimensions. The value proposition of AI, therefore, is not only about solving problems but also about realizing the diverse benefits that AI technologies can bring. This includes creating added value for companies, their customers, their employees, and the broader innovation ecosystem. Achieving this requires a holistic approach that balances economic, social, and technological aspects, considering not just the business perspective but also the viewpoint of end users.

This expertise centers on such a holistic approach to unlocking the full value creation potential of AI. To realize value across multiple dimensions – whether for the company itself, its customers, or its employees, and indirectly for the broader technology and innovation landscape – it is crucial to minimize the risks associated with AI adoption. To illustrate the opportunities, prerequisites, and challenges of leveraging AI, the white paper provides concrete use cases and practical examples as sources of inspiration. These case studies showcase implementation strategies, solution pathways, and the necessary legal frameworks while demonstrating the tangible benefits and added value that AI can deliver. Moreover, they serve as references for best practices, offering guidance on introducing AI technologies, reducing uncertainties, identifying potential obstacles early on, and minimizing investment and innovation risks by adapting proven business model concepts. The multifaceted dimensions of AI's value proposition become evident through the qualitative interviews conducted, highlighting just how diverse and impactful AI-driven value creation can be.

Research Findings Demonstrate the Value Creation Potential of AI

Current research leaves no doubt that AI holds immense potential across diverse application areas and business models within companies. At the same time, it highlights the challenges that need to be addressed when adopting AI. A comprehensive review of existing research – such as McKinsey studies, EFI reports, and the OECD AI Review of Germany – provides ample evidence of these potentials. These studies demonstrate that AI can optimize existing processes, enhance automation, enable transformative information and interaction effects, and make accurate predictions about future developments.

However, these studies also identify hurdles that businesses, especially SMEs – still face when implementing AI. The most frequently cited obstacles include a lack of time or human resources (68 per cent and 72 per cent), uncertainty about the expected benefits (64 per cent and 68 per cent), concerns about AI maturity and reliability (60 per cent and 56 per cent), and insufficient knowledge or expertise within the company. Yet, it is worth noting that most of these studies take a predominantly one-dimensional, technology-centric perspective on the AI value proposition, as they tend to focus on a specific AI technology and its perceived value for the individual business.

Qualitative Survey: Survey Methodology and Analysis

To fully unlock the value creation potential of AI and adhere to the holistic approach, a qualitative survey based on a questionnaire (inspired by the Business Model Canvas concept) was conducted, focusing on the value proposition of AI. The main purpose of the survey was to gather concrete "first-hand" insights and identify commonalities and differences, as well as strengths and challenges, in order to derive actionable recommendations. Participants included representatives from various sectors, such as energy, finance, mobility, pharmaceuticals, information and communication technology, and public administration. The survey particularly focused on the different dimensions of AI's value proposition – both for the company itself, as well as for customers and employees – and the AI technologies used to fulfill this value proposition. Additional questions addressed the prerequisites and challenges associated with AI adoption, as well as the cost and value structures involved in implementing and utilizing AI within companies.

The survey was conducted between December 2023 and March 2024. In total, ten online interviews with company representatives were carried out, along with an additional expert interview. Two written questionnaires were also submitted by other company representatives.

Aggregated Results

The survey revealed a diverse range of AI value propositions, identifying dimensions such as efficiency enhancement, product, process, or service improvement, as well as positive effects on work processes and employee development. For example, the pharmaceutical company Merck utilizes AI in the development of novel drugs, achieving a potential savings of up to seven hours per week in repetitive tasks. This frees employees from monotonous work, allowing them to focus on more varied or challenging tasks.

The survey results also highlight that certain prerequisites are crucial for the development and application of AI to deliver real value – regardless of the industry or the AI technology used.

The most important prerequisites for the successful deployment of AI within companies were identified as:

- **Data Availability and Quality:** Only high-quality data can produce accurate and reliable results. It is crucial for users to ensure that their data is of high quality, and that appropriate measures for data preparation and cleaning are implemented within companies.

- **Reliable and High-Performance Digital Infrastructure:** Such infrastructure ensures the smooth integration and execution of AI algorithms.

- **AI Competencies of Users:** This is less about technical expertise in areas like Data Science, Machine Learning, or AI Engineering, but rather about having an informed, professional, and critical approach to using AI technologies in daily operations to unlock the full benefits of the technology. For example, radiologists must be able to interpret and critically assess results based on AI-driven image recognition methods.

As potential hurdles and challenges that can hinder the development and implementation of AI technology, the survey identified primarily the design and enforcement of data protection regulations, which heavily restrict the use and sharing of (personal) data. This may require additional measures for companies, adding costs that can sometimes hinder investment in and adoption of AI technologies. Additionally, political regulation of AI development and application, which may involve lengthy approval processes or bureaucratic requirements, is seen as an innovation barrier. Unrealistic and exaggerated customer expectations, fueled by current hype and media coverage surrounding AI, were also mentioned as factors that complicate the adoption of AI.

Contextualization of Survey Results

Overall, all respondents confirmed the added value of AI. Through the interviews, it became clear that AI offers cross-industry benefits and is often adaptable to a wide range of applications. While the adoption and benefits of AI are evident across many industries, this observation does not necessarily apply uniformly to the types of companies using AI. The contextualization of the survey results provided key insights into this and other aspects:

- **AI Deployment Across Company Sizes:** While AI is used across industries, its application varies significantly depending on company size. Large corporations and startups are the primary users of AI, driven by larger budgets, financial resources, and more advanced digitalization processes. In contrast, SMEs lag behind due to financial, personnel, and data-related challenges. Large companies typically have access to the necessary data, whereas SMEs often have limited access. Furthermore, large corporations tend to scale AI-based applications across different business areas to maximize potential value, as AI is not confined to a single use case.

- **Generative AI in Companies:** Regardless of size or industry, companies benefit from generative AI without needing extensive expertise or resources. This is due to its versatility, intuitive accessibility, and broad applicability across various sectors and contexts. However, many companies face the challenge of maintaining control over their business data when using AI models from external providers.

- **AI & Value Proposition:** The identified value propositions, such as efficiency improvements, service personalization, and process automation, cannot be realized to the same extent with other technologies, particularly when it comes to analyzing large and complex datasets. AI plays a significant role in fulfilling these value propositions, though its role in the sales and marketing process varies. In some cases, AI is marketed as a unique selling point, but more often, it is positioned as an integral technology working in the background to enhance the product. Once AI is established, it becomes a standard technology. However, when AI is newly introduced in weaker areas or when novel AI technologies are implemented, it tends to be more prominently featured.

Design Options

From the survey results and the derived implementation options, specific recommendations can be made to fully unlock the value proposition of AI use – maximizing its potential while minimizing risks:

- **Holistic Approach to Connecting Different Value Propositions:** The study on AI's value proposition shows that businesses, customers, and employees each associate different expectations and hopes with technology. The term "value" is multifaceted and can refer to economic profitability, efficiency improvements, product quality, customer satisfaction, or better working conditions. Companies should recognize and strategically address these various aspects of value creation. Therefore, a holistic approach that integrates economic, ethical, and social aspects is recommended.

- **From Abstract Discussions to Practical AI Application:** There is a need to shift from abstract discussions to concrete AI applications in everyday business operations to realize the potential value. This requires an innovation-friendly environment, measurable goals, investment in digital infrastructure, and interdisciplinary collaboration between technical experts and departments within companies. Transparent communication and pilot projects are also crucial for fostering acceptance and trust, demonstrating early successes as well as potential missteps. These actions enable the transition to practical AI applications and help companies fully realize the benefits of AI.

- **Leveraging Existing AI Competencies and AI Research:** The survey shows that widely available AI competencies and AI research no longer pose significant barriers to successful AI adoption, as was the case five years ago. AI research in Germany is globally leading, and the necessary competencies are widespread among employees. Companies should leverage these favorable conditions and prerequisites to efficiently integrate AI technologies and advance their own innovation projects.

- **Supporting SMEs in AI Development and Application:** SMEs often face challenges accessing adequate data and financial resources. Therefore, investments in data, infrastructure, training programs, and targeted support measures (such as AI service centers and funding initiatives) are crucial to improving access to high-quality data and financial and advisory support.

Broad AI adoption can only succeed if tangible benefits are communicated transparently and practically. Focusing on measurable use cases and strategically presenting successful AI projects is essential to building trust and increasing readiness for adoption within the economy and society. By considering the holistic approach to the value proposition, the diverse potential of AI for value creation can be fully unlocked.

Imprint
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