Finanzgruppe
Hochschule für Finanzwirtschaft & Management

AI applications in the banking sector worldwide

HFM Research Report
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Management Summary

This research report analyses the productive use of AI in banks worldwide. The study is based on a structured survey of use cases since 2023 and is supplemented by current market and study sources.

The study focuses on the question of where, how and for what purpose banks are using AI today. The results paint a clear picture: the use of AI is noticeable globally, but is heavily concentrated in a few countries with a high degree of digitalisation and a strong culture of innovation. Technologically leading economies such as the US and Western European countries are playing a pioneering role in this regard.

In terms of content, an operational perspective dominates: banks prefer to use AI where processes can be automated, resources saved or customers served more efficiently. The focus is on internal assistance systems, chatbots, recommendation solutions and analytics – often in direct customer contact. AI is correspondingly well established in sales and service.

Strategic or regulatory complex application areas such as risk management, compliance or IT security have been much less common to date. The use of high-risk AI systems – for automated credit decisions, for example – also remains the exception. Many institutions are therefore deliberately operating in low-risk areas, which favours rapid implementation, lower requirements in terms of data protection and the EU AI Act, and governance structures.

At the same time, it is becoming apparent that banks are increasingly moving towards data-driven business models. The use of AI is becoming broader, more mature and functionally more versatile. However, the path to strategic penetration – towards innovative products, adaptive systems and trustworthy AI – has not yet been completed.

This results in a twofold need for action on the part of decision-makers: on the one hand, existing applications must be scaled up in a targeted manner and the operational basis consolidated. On the other hand, courage and structure are needed to responsibly tap into new, strategically critical AI fields that require explanation.

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1. Introduction

1.1. Objective

The study provides an empirical picture of global AI usage.

The research report presents an empirically based picture of the global use of artificial intelligence (AI) in the banking sector. The focus is on both the quantitative analysis of AI use cases in 75 countries and qualitative findings on strategic goals, benefits and risks. An empirical study starting in 2023 serves as the central data source.

1.2. The importance of AI in banking

AI is accelerating the transformation process at banks.

AI technologies are fundamentally changing the banking sector – from the automation of repetitive tasks to the generation of personalised financial advice. Generative AI (GenAI) now enables banks to create scalable solutions for front, middle and back office processes. According to McKinsey (2024a), GenAI could generate up to USD 340 billion in additional value in the banking industry each year. According to a forecast by management consultancy Roland Berger, the use of artificial intelligence (AI) in international banking has significant value creation potential by 2030. AI-based innovations could open up additional sources of revenue amounting to around USD 1 trillion. At the same time, both operating expenses and risk-related costs are expected to be reduced by up to 30% (Roland Berger 2024). Competition for data-based business models is becoming increasingly fierce, with traditional banks entering into direct competition with fintechs and big tech companies (McKinsey, 2024b; Accenture, 2024).

1.3. Method

The primary data source for this report is a structured collection of AI applications in productive use in the banking sector since August 2023, which is updated on an ongoing basis. The methodology is based on a systematic desktop research process using the following criteria:

- Types of institutions: The analysis only considers retail banks, major banks, investment banks, state banks and other credit institutions that correspond to the classification used by the Deutsche Bundesbank.
- Insurance companies, construction financiers, specialised banks (e.g. development banks, mortgage banks) and credit card companies were excluded in order to maintain comparability within the banking sector.

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- Status of applications: Only AI applications in productive operation were considered. Experimental, planned or purely conceptual projects were deliberately excluded in order to reflect the maturity of AI adoption in a realistic manner.
- Time frame: Data collection began in August 2023. Since then, the list has been continuously expanded and updated to include the latest developments up to August 2025. As of 5 August 2025, the research covers 355 institutions.
- Methodology: The information was collected through systematic desktop research from publicly available sources (including press releases, annual reports, studies, websites of banks and technology providers) and recorded in tables (see appendix). For contextualisation, additional current studies and market analyses were consulted, including those by Accenture (2024), McKinsey & Company (2024–2025), Publicis Sapient (2024), Roland Berger (2024), Statista (2025) and WWT Research (2025).

These enable a valid assessment of global developments and provide comparative values for the relevance, prevalence and impact of AI in the banking sector.

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2. Results

2.1. Global distribution of AI applications in banks

The USA is the leader in AI applications.

The USA has by far the highest single value, leading the way with 71 documented AI applications. This means that around 20% of all cases recorded worldwide are in a single country. This dominance can be explained by several structural factors: the high innovative strength of American banks, the strong technological infrastructure, intensive cooperation with large technology companies (e.g. Microsoft, Google, Amazon), and a comparatively innovation-friendly regulatory environment. The large deviation between the mean (Ø 19.2 applications) and the median (4 applications) as well as the high standard deviation (47.4) indicate a highly uneven distribution.

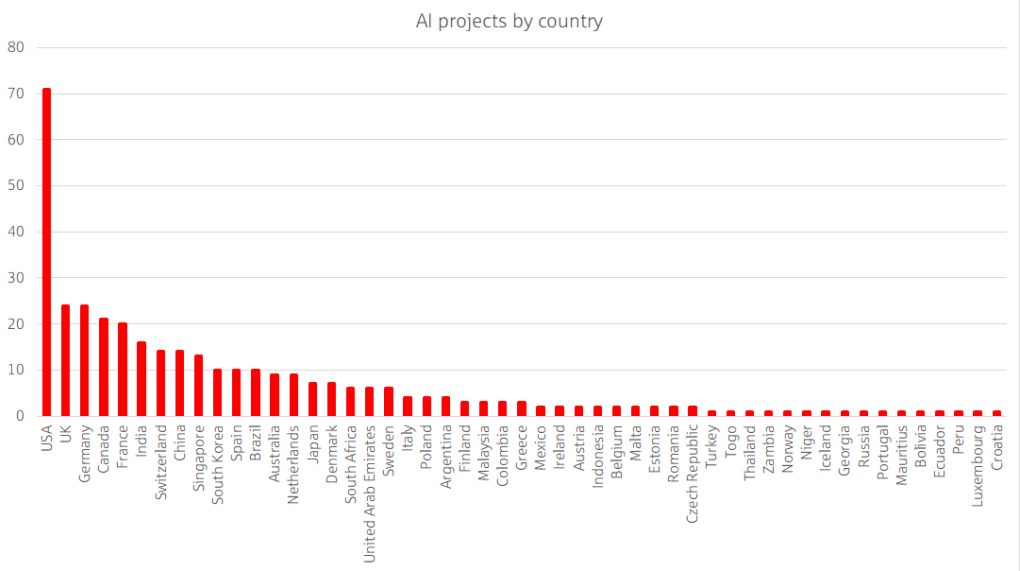

Figure 2.1 AI projects by country

Germany and the UK are neck and neck.

Alongside the US, Germany and the United Kingdom are among the leading nations with 24 applications each. Both countries have large, internationally active banking sectors and strategic digitalisation initiatives. Countries such as Canada (21 applications), France (20), Switzerland (18) and India and Australia (13 each) are also strongly represented. These countries have well-developed financial systems and a growing willingness to embrace digital transformation. In contrast, there is a large group of countries with very few recorded applications. In many cases, the number is below five.

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Rank	Country	Number of AI applications
1	USA	71
2	Germany	24
3	UK	24
4	Canada	21
5	France	20
6	Switzerland	18
7	India	13
8	Australia	13
9	Singapore	12
10	Spain	12

Figure 2.2 TOP 10 by country

2.2. Distribution by continent

Europe is the strongest continent for AI.

The analysis by continent shows that Europe is the leading continent with 150 documented applications. However, the distribution is not even: countries such as Germany, the United Kingdom, France and Switzerland stand out with double-digit numbers of cases, while other countries – especially in Southern and Eastern Europe – only have a few applications. This can be explained by the large number of participating countries and the strong banking sector, particularly in Germany, the UK, France and Switzerland. North America, mainly driven by the US and Canada, follows with 94 applications.

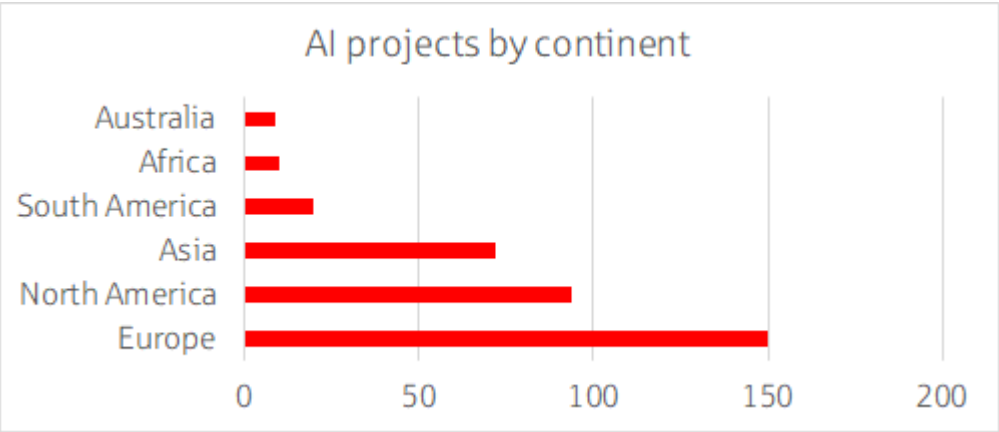

Figure 2.3 AI projects by continent

Asia and North America follow significantly behind.

Asia ranks third with 72 applications, with strong contributions from countries such as India, Singapore, Japan and China. Africa (10 applications) and Australia (9 applications) show significantly lower adoption rates. The continental distribution shows that global AI adoption in the banking sector is dominated by Europe, North America and Asia, while other regions currently play a minor role.

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2.3. Distribution by year of introduction

It is difficult to determine the exact timing.

Due to the research methodology, determining the exact date of introduction of the AI applications under review is subject to uncertainty. The information often comes from press releases, specialist articles or project descriptions that are published after the actual introduction. In addition, banks do not always communicate promptly or transparently about the specific launch of new technologies. In order to make statements that are as valid as possible, source triangulation was used to assign the year of introduction: several independent publicly available sources were compared for each use case.

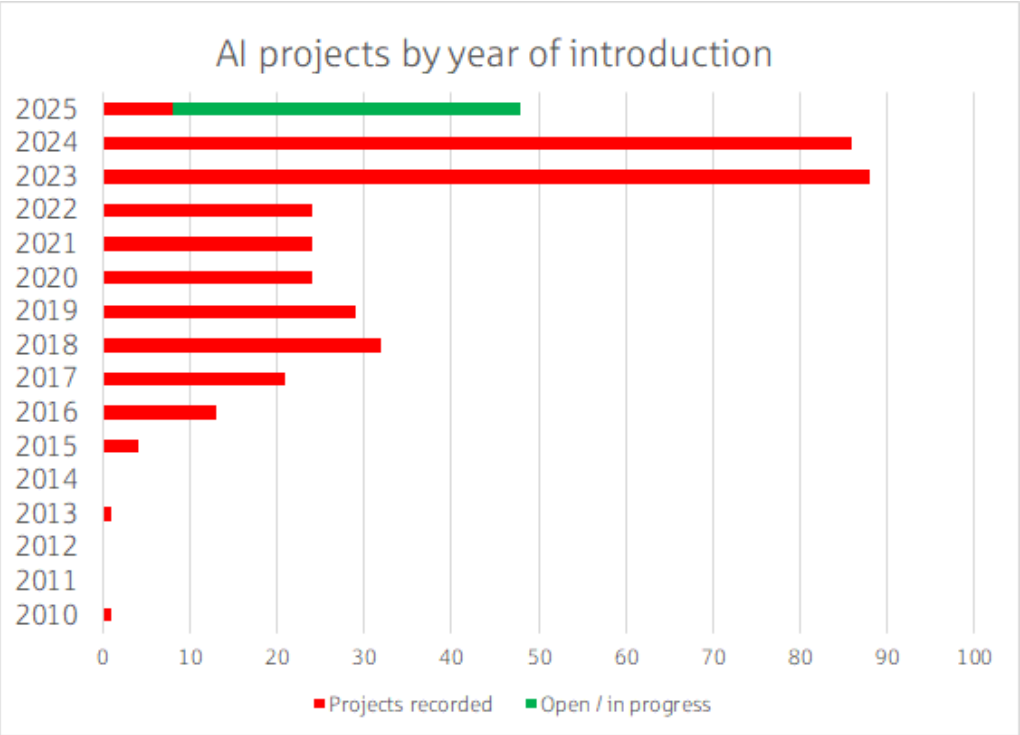

Figure 2.4 AI projects by year of introduction in operational use

The number of AI applications implemented in banks has grown dynamically and rapidly in recent years. The timeline can be divided into three phases:

Pioneering phase (2010–2015)

The pioneer phase is characterised by experimental AI activities

Between 2010 and 2015, only six AI projects were introduced. This phase was characterised by technological pioneering work and exploratory prototypes. Implementation was mostly limited to pilot projects in specialised innovation departments.

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Early scaling phase (2016–2022)

Successful AI applications paved the way for further AI investments.

A steady increase has been observed since 2016:

- First double-digit case numbers from 2016 (13 projects),
- Peak values in 2018 (32 projects) and 2019 (29),
- Stable level between 2020 and 2022 with 24 projects each.

This phase shows the transition from research to the organisational integration of individual AI solutions, especially in the areas of customer service and data processing.

Acceleration phase (2023–2024)

2023/2024 were boom years for AI.

In 2023 and 2024, the number of new projects skyrocketed, with 88 and 86 documented applications, respectively. This corresponds to almost half of all recorded cases. The main drivers were:

- The spread of generative AI (e.g. GPT models),
- Advances in infrastructure and model accessibility
- increasing competitive pressure, particularly from fintechs,
- and a growing number of productive reference examples on the market.

Current year 2025

In 2025, an initial consolidation trend is emerging.

As of the evaluation date, eight AI projects had been documented for 2025. This figure should be interpreted as an interim result, as approximately 40 projects are currently undergoing quality assurance for inclusion in the database. However, a new phase of consolidation may also be emerging, in which banks optimise and integrate existing systems rather than piloting new use cases.

2.4. Distribution by user group

Internal users dominate the user group.

Most applications are aimed at internal users, such as employees in customer service, IT, risk management or controlling. This demonstrates the high importance of AI for automating and increasing the efficiency of internal processes.

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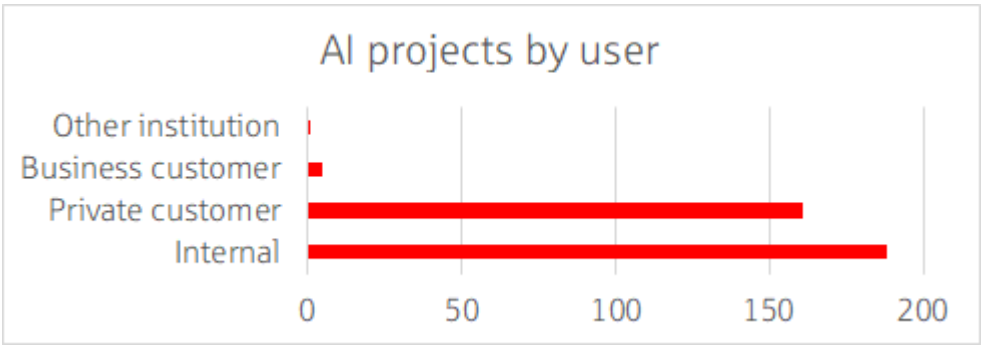

Figure 2.5 AI projects by user

Private customers are the second most important target group.

Private customers follow in second place with 161 cases – an indication of the increasing use of AI to personalise advice, services and product offerings. In contrast, business customers are a much less frequent target group, with only five applications currently documented. The proportion of applications for "other institutions" is equally marginal. These include AI applications that banks make available to other institutions as software-as-a-service (SaaS). Overall, the institutions are pursuing an AI strategy that is more internal or end-customer-focused. This is also reflected in the classification of AI applications.

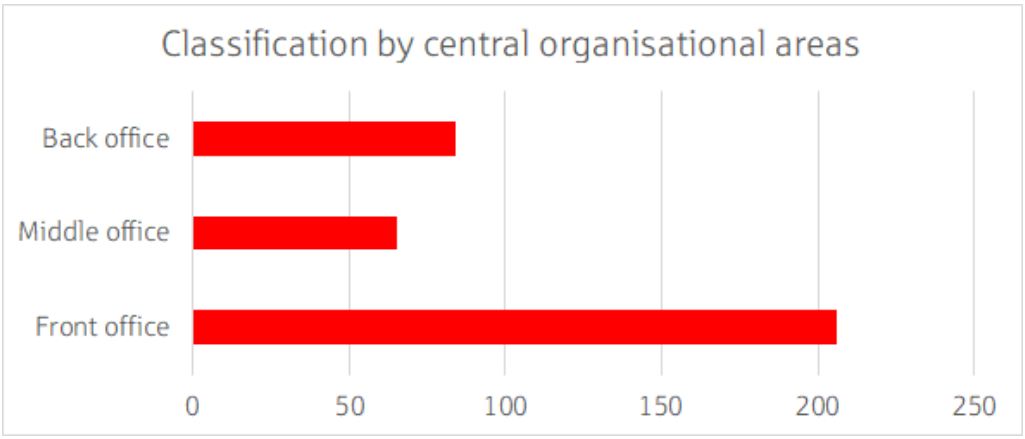

Figure 2.6 AI projects by central organisational areas

Front office is the most important area of application.

With 206 documented cases, the front office is by far the most important area of application. This includes applications that are embedded in direct customer contact or in interaction with customer data. These include:

- Chatbots and voice assistants,
- Personalised product recommendations,
- Automated customer advice,

This distribution illustrates that banks primarily use AI as a means of improving the customer experience and increasing efficiency in sales and service. In an increasingly digital competitive environment, the ability to make fast, accurate and personalised offers is becoming strategically important.

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The back office serves to automate processes.

With 84 cases, the back office is also a key area of application, albeit significantly behind the front office. Typical applications include:

- CO-pilots (digital assistants to support employees in their daily work),
- Document processing (OCR, classification),
- Invoice matching and transaction processing,
- regulatory reporting and reporting processes.

These types of applications are often technical in nature and aim to automate processes, reduce costs and prevent errors.

AI applications in the middle office are not currently a focus.

The middle office, with 65 applications, brings up the rear, even though it plays a key role in many banks – for example, in risk management, compliance and the monitoring of trading activities. AI could be used here, for example, to:

- Detect anomalies and risks
- Detect fraud
- Sanctions list checks (AML/KYC)
- stress tests and scenario analyses.

The comparatively low number of AI applications in this area could indicate a greater need for explainability or technological complexity.

Banks primarily use AI in the front office, where rapid efficiency gains or immediate customer benefits can be achieved. Although the potential in middle and back office processes is increasingly being recognised, it is not (yet) being realised to the same extent.

2.5. Distribution by potential benefit

AI primarily increases efficiency.

A key criterion for evaluating the use of AI in banks is the objective or strategic benefit that institutions hope to achieve by using such technologies. When interpreting the results, it should be noted that many AI applications cannot be assigned to a single objective. In practice, numerous solutions address several potential benefits at the same time. For example, a chatbot in customer service can increase efficiency and improve the customer experience.

With 221 documented applications, increasing efficiency is by far the most common focus of benefits. Banks primarily use AI to automate manual processes, reduce costs and shorten throughput times – for example, through document classification, fraud detection or automated processing of customer enquiries. This confirms the strongly operational focus of many institutions' digital strategies.

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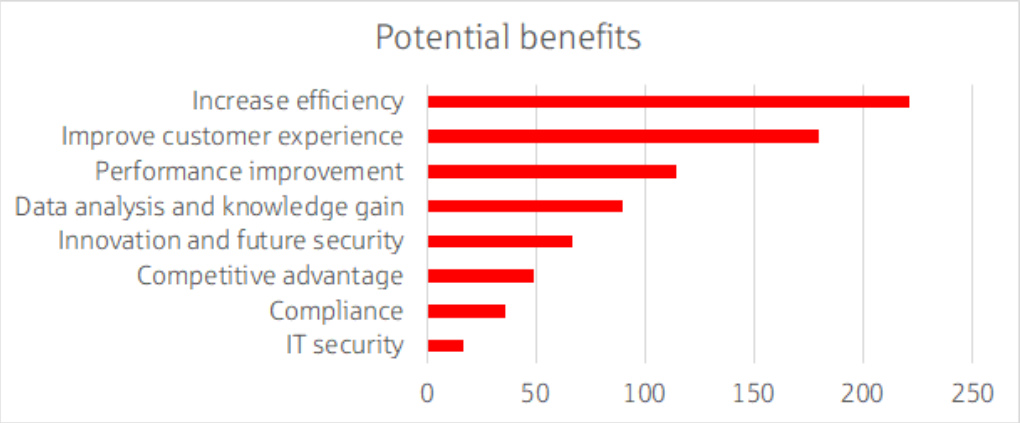

Figure 2.7 Distribution by potential benefit

Focus on customer experience

Customer experience is becoming increasingly important.

180 applications are aimed at improving the customer experience. These primarily include chatbots, personalised product recommendations and intelligent assistants in sales. This high value shows that banks are increasingly recognising that digital service quality is a competitive advantage – especially over neobank-like fintechs with native digital customer solutions.

Performance and knowledge gains

With 114 applications, a significant proportion of AI projects aim to improve performance, for example through better risk models, automatic portfolio analysis or intelligent resource allocation. In addition, 90 applications explicitly aim to analyse data and gain insights – which is reflected in the use of machine learning for pattern recognition, forecasts or decision support.

Securing the future and gaining a strategic edge

67 applications address the topics of innovation and future security, for example through the exploratory use of generative AI, new digital products or adaptive processes. A further 49 cases explicitly mention the desired competitive advantage – a sign that some banks already regard AI as a differentiating feature in their market positioning.

Compliance and IT security: potential not yet fully exploited

Compliance and IT security are underrepresented.

The figures are remarkably low in areas that are particularly relevant to regulation:

- Compliance: Only 36 applications explicitly pursue this goal – despite high regulatory requirements in the banking sector. This indicates a need to catch up in AI-supported compliance with legal requirements (e.g. money laundering, ESG reporting).

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- IT security: Only 17 applications cite cybersecurity as their primary benefit objective. This is surprising given the increasing threat landscape and the growing dependence on AI itself.

Front office reflects benefit priority.

The use of AI in banks is currently strongly motivated by pragmatic considerations. The vast majority of projects pursue short-term goals such as efficiency, cost optimisation and customer service. As shown above, the front office accounts for the largest share with 206 of 355 applications. This is in line with the dominant benefit goals: customer experience and efficiency are classic areas for optimisation in direct customer contact – for example, in sales, product offerings or service processes.

Internal use cases dominate the AI application landscape.

By far the largest user group is internal staff (188 applications), followed by private customers (161 applications). The strongly operational objectives of most AI applications (efficiency, performance) fit well with the high proportion of internal use cases, such as the automation of internal processes, decision support or process control.

At the same time, the strong anchoring in the front office shows that customer-oriented AI systems have a high degree of maturity – visible, for example, in 180 applications aimed at improving the customer experience. Strategic benefits such as competitive advantage (49 cases) or innovation (67 cases) are significantly less common, reflecting the still low proportion of experimental, strategically novel AI initiatives.

2.6. Classification on the AI map

The analysis uses an "AI map" to classify AI use cases according to typical banking functions and process areas. This distinguishes between different areas of banking operations – from customer processes to products & prices, operational control, marketing & sales, and technical cross-cutting issues such as IT security and data management. This reveals where AI is actually used within the bank's organisation and how frequently.

The AI map is not a rigid categorisation framework in which each AI application is assigned to a specific area. Rather, it is a multidimensional classification model designed to map the complex use of AI in banks. Many applications cover several functions or benefits at the same time – and can therefore be located in multiple areas of the AI map.

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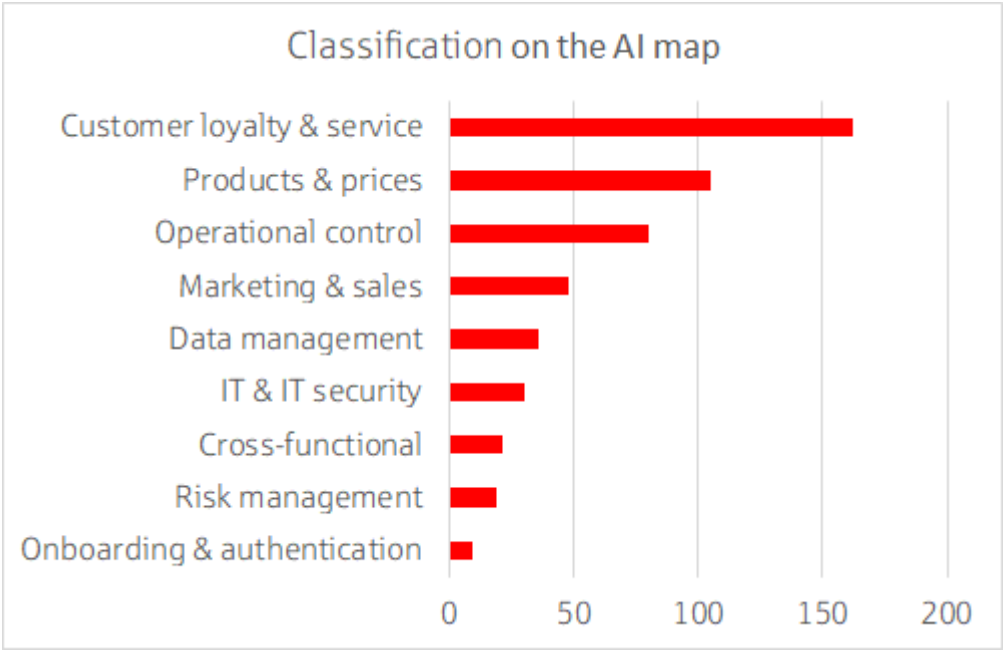

Figure 2.8 Classification on the AI map

Customer loyalty & service – the focus of the AI strategy

Customer service is a key area of application.

With 162 applications, this area is by far the most active field of AI in banks. It includes chatbots, service automation, response intelligence in customer portals and personalisation mechanisms. These data confirm the strong anchoring of AI in the front office, as shown above, and the frequently pursued goals of "customer experience" and "efficiency".

Products & prices – data-driven product logic

105 applications relate to product-related functions, such as AI-based pricing, credit decisions, offer personalisation and portfolio recommendations. This figure shows that banks are increasingly using data and models to dynamically manage their product architecture – a trend that is consistent with the growing use of recommendation engines and scoring algorithms.

Operational control – AI as an internal optimisation tool

With 80 cases, this area ranks third. It includes, for example:

- Process automation in controlling or finance
- Resource planning
- Workflow optimisation

The high number of cases is consistent with the high internal user rate and the dominant goal of "increasing efficiency".

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Marketing & Sales – Data-driven customer approach

48 applications are located in the marketing context, e.g. through segmentation models, campaign optimisation or conversion analyses. This category also reinforces the image of a customer-oriented, data-driven AI strategy in banking sales.

Technological infrastructure: data, IT & security

Technical areas are less prominent.

The following three areas are more technical or supportive in nature:

- Data management (36): e.g. data cleansing, feature engineering or metadata analysis
- IT & IT security (30): including intrusion detection, authentication systems or cyber monitoring
- Cross-functional roles (21): e.g. knowledge management, compliance checklists or model monitoring

Although these categories are central to technology, their low number of cases shows that many AI projects are initially anchored in technical functions before technical infrastructures are optimised.

Risk management and onboarding – underrepresented

Risk issues have been poorly addressed to date.

Despite high regulatory requirements and relevance, risk management (19 applications) and onboarding & legitimation (9 applications) are still underdeveloped areas. This is remarkable, as these areas could benefit particularly from predictive analytics, biometric legitimation or fraud detection – but at the same time are subject to high requirements in terms of data protection, model transparency and auditability.

The analysis of the AI map confirms the overall picture to date:

- The focus is on customer-oriented, sales-related and productive areas of application,
- with a strong operational focus on service quality, offer management and efficiency.
- Supporting or regulation-related fields (risk management, compliance, IT security) are underrepresented – not necessarily because they are irrelevant, but probably because of higher implementation hurdles.

The focus of AI is on measurable effects.

This shows once again that the current use of AI in banks is driven by rapid, measurable business impacts – but has not yet been systematically rolled out across all core banking functions.

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2.7. Risk classification according to the EU AI Act

The following analysis is based on a categorisation of AI applications according to the provisions of the EU AI Act – the EU regulation on the regulation of artificial intelligence that has been in force since 2024. One challenge was to classify AI applications outside the EU in accordance with the EU AI Act. To this end, a comparison was made with corresponding systems that have the same or comparable functionalities.

More than 90% of all applications fall into the two lower risk classes:

- 192 applications in class II (limited risk),
- 141 applications in class I (low risk).

These two classes mainly concern:

- chatbots and recommendation systems (Class II),
- internal assistance systems, automation, analysis models (Class I).

Over 90% of systems are subject to simple requirements.

This means that the vast majority of AI solutions in banks are not subject to strict regulatory requirements but can be used relatively unbureaucratically, provided that simple transparency obligations are met. This reflects the finding to date that banks primarily rely on AI that can be used pragmatically and operationally.

High-risk AI is rare but strategically sensitive

22 applications were classified as Class III (high). According to the EU AI Act, these require, among other things:

- risk management systems,
- technical documentation,
- Human oversight of AI by natural persons with the necessary competence,
- explainability and traceability.

Examples of this include:

- Automated credit checks,
- KYC processes with biometric analysis,
- AI-driven risk models,
- Decision-making systems with high customer influence.

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Despite their small number, these applications are disproportionately relevant because they directly intervene in regulatory-sensitive processes and may affect the legal status of customers.

No applications with prohibited risk

As expected, category IV (prohibited) remains empty. This is in line with the legal framework, which explicitly prohibits certain AI systems, such as those used for social scoring, mass biometric tracking or manipulative techniques. Such systems play no role in the traditional banking sector.

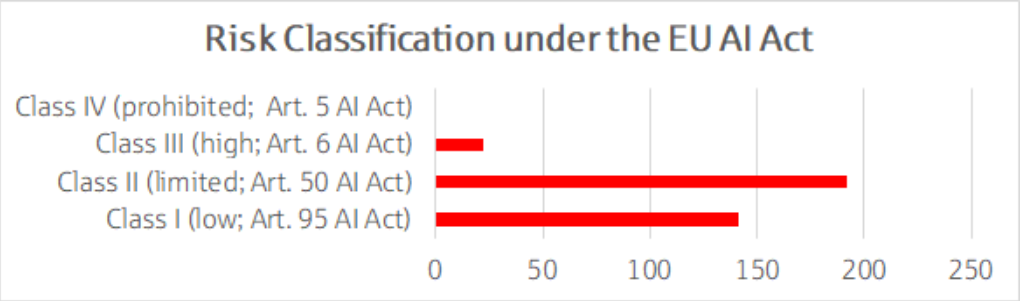

Figure 2.9 Distribution according to risk classification EU AI Act

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Appendix

Database schema for recording AI applications

Attributes	Content
ID	Sequential numbering of use cases
Country	Geographical location of the bank's head office
Company	Name of the bank
Project name	Name of the AI application (optional field).
Initial situation	Description of the banks' motivation for introducing the application.
Detailed description	Detailed description of the AI application.
Location	Classification of whether the application belongs to the front, middle or back office.
Application of AI	Name the functional basis of the AI application.
Assignment to AI map	Location of the applications on the AI map. (Multiple entries possible)
Potential benefits	Determination of the benefits or added value of the AI application from the bank's perspective. (Multiple entries possible)
End user	Users of the AI application
Year of introduction	Year of introduction of AI application into operational use.
Type of financial services provider	Selection of the type of financial services provider, in particular retail bank and commercial bank.
Technology provider	Optional field for recording technology partners
Status	Status of the application.
Notes	Free text field for optional additional notes and information.
Sources	Collection of relevant URLs for all information contained.

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