

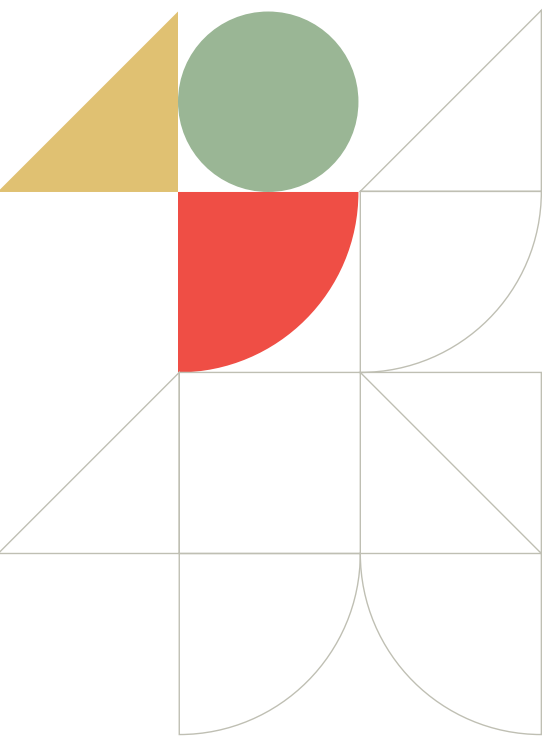
Which AI Use Cases are Worth the Investment?

A quantitative framework for evaluating AI opportunities through ROI, time to value, and risk, with practical applications for the Insurance sector.

■ White paper

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Setting the context

I am an AI strategy and product consultant currently working for a UK-based insurer, where I help set up an AI center of excellence. My work involves engaging with stakeholders across divisions including underwriting, IT, HR, agency, and customer service. I evaluate and refine use cases, create high-level product specifications for solution development, and support the design of AI and data-for-AI governance.

The business is committed to adopting AI, but the central challenge is determining which use cases warrant investment. This has driven the development of a structured assessment framework to bring rigor and consistency to that decision-making process.

The framework builds on the four categories of AI usage within an enterprise context defined in a "4-level AI framework" proposed by Oxford Professor Kejia Hu (2026). One way I have sought to improve the existing framework is to surface and document the risks associated with each AI implementation, a particularly critical consideration in a heavily regulated sector like Insurance.

Surveying the AI landscape in Insurance

AI is already embedded in how insurance companies work. A survey focused on the insurance sector by AI benchmarking firm Evident AI (Haynes et al., 2025, p. 9) indicates that the most common use cases are in claims (26.4%), customer service (15.1%), knowledge democratization (13.2%), and underwriting and pricing (13.2%). According to a BCG report (Apotheker et al., 2025, p. 9), 50% of surveyed insurers use AI for fraud detection and claims, while 39% use it in underwriting. These statistics inform the following examples of deployed AI solutions to give us an idea of the capabilities of AI:

Customer service and knowledge democratization

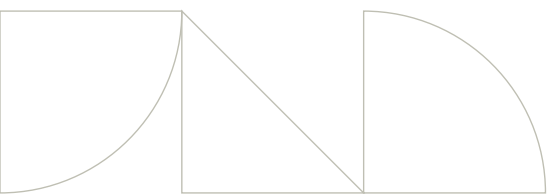
A report by BCG (De Bellefonds et al., 2024, p. 10) revealed that a life insurer in Asia identified two use cases, one for customer service and a second for sales and marketing, with the former enjoying a reduction in effort of up to 30%, and the latter saving 30%-40% of the time producing marcomm assets. The same report also indicates that the biggest uses of generative AI are summarization and answering queries.

Fraud probability detection

A US-based insurer replaced its rules-based fraud algorithm with a machine learning algorithm developed by Zensar (2026) to reduce false positives. The new ML system's precision rose from 12% to 57% in blind validation with risk analysts, while false positives fell by 90%.

Underwriting and pricing

According to Evident AI (Haynes et al., 2025, p. 10), the North American, UK, and Ireland insurer Travelers expedited the underwriting and pricing of small business insurance with an AI model that consumed a business' location and public data (e.g., social media), offered real-time business risk classification guidance to human agents, and cut down the number of questions asked to potential customers from 40 to nine.



Damage assessment

A Department for Science, Innovation, and Technology, UK, report on the AI sector (2025, p. 12) states that computer vision (CV) could be used in claims processing. They gave an example of a machine learning and CV solution by Tractable that analyzes images of natural disasters and road accidents, thereby speeding up a manual process.

No one-size-fits-all

These reports dispel any doubt that AI can execute tasks with acceptable accuracy and usable output. One might conclude that any of these use cases could be implemented at scale by any insurance company and deliver similar workflow efficiency or revenue increases.

I believe that while it is good to understand how insurers use AI, it is a mistake to assume we can copy-paste solutions into different contexts and expect the same outcomes. No two businesses are alike. Big differences in AI understanding, workflows, leadership alignment, risk tolerance, data readiness, staff know-how, governance policy, IT infrastructure, internal bureaucracy, and more can make or break AI operations.

We must ensure a good fit between AI adoption strategies and organizational realities. To that end, the conceptual tool I propose helps organizations navigate this new era of AI disruption and opportunity, especially when quantifying use-case value.

AI Investment Opportunity (AIO) framework

The AIO framework consists of three main parts:

1. Use case categorisation
2. Return on investment (ROI)
3. Risk estimation

The framework can improve the chances of fully deploying AI applications that deliver measurable results.

Use cases do not automatically go from proof-of-concept (POC) to production. According to MIT NANDA research with 153 business leaders (Challapally et al., 2025, pp. 2-3), only 20% of custom- or pre-built AI systems are selected for pilots, and only 5% make it to deployment. That's one in 20 use cases. A more strategically sound AI adoption framework can lift businesses out of resource-draining POC/pilot quagmires.

Unpacking the framework

The AIO framework assumes that stakeholder proposers, business function or division leads, and others with a vested interest in successful AI implementation have completed a round of use case generation.

The framework also assumes that, at a minimum, a core team of business analysts/strategists and technical AI experts is available to help implement the methods in the two stages outlined below.

AIO framework stage 1:

Use case categorization and ROI projection

My AI Investment Opportunity (AIO) framework adds a fifth factor, "Augmentation", to the existing four factors within the 4-level AI Framework proposed by Professor Hu (2026). The core team tags each potential use case with one of the following categories: automation, augmentation, personalization, operational innovation, or business innovation.

Here are definitions for each category and example use cases for my AIO framework:

1) Automation use cases are characterized by AI systems completing tasks with minimal user involvement. For example, after phone interactions with human customer service agents, the system automatically generates call summaries, customer sentiment analyses, and AI-recommended next steps, then stores them in the relevant CRM database.

2) Augmentation use cases include, for instance, AI agents that assist underwriters with data collection, analysis, pricing, and documentation. AI augmentation enables employees with poor or average skills to do better work. It also helps star personnel reach higher performance levels, according to Ethan Mollick, who cites a BCG study in his book "Co-intelligence" (2024, p. 156).

3) In terms of personalization use cases, these are where customers receive customized interactions or tailored output; for example, chatbot exchanges or product recommendations grounded in customer data.

4) Operational innovation use cases reimagine internal business processes and workflows to reduce cost or increase the speed and quality of services. They have significant payoff potential. For example, employing predictive AI for human resource allocation or using generative AI to produce marketing collateral and expedite approval processes.

5) Lastly, business innovation use cases are highly transformative; they leverage AI to materially alter how a business serves its customers, i.e., its business model. They can deliver transformational payoffs and open substantial new revenue streams. Of course, they also carry significant failure risks. An example of this kind of use case might be a new service by an insurer that helps customers reduce their risk profile based on years of historical predictive analysis data covering their entire customer base (Agrawal, Gans and Goldfarb, 2022, p. 236-237). For a new life insurance product, the insurer could offer bespoke, risk-lowering lifestyle recommendations to policyholders based on data they have on them. While this may reduce premiums over time, the proposition is market-disrupting enough to attract a significant volume of new customers.

Now that we have a clear definition of each of the five use case categories, the next step is to estimate roughly how much value each use case will deliver. There are different ways to do this and various metrics we could employ, but for this essay, we will estimate the return on investment using the ROI formula below:

$$\text{ROI} = [(\text{Estimated Value} - \text{Cost of Investment}) / \text{Cost of Investment}] \times 100$$

For instance, if the estimated cost reduction from deploying use case X is £55,000 per year, the total cost to build the app is £30,000 in year one, and it costs £10,000 to maintain it every year:

- Year 1 ROI = $[(55,000 - 40,000) / 40,000] \times 100 = 37.5\%$
- Year 2 ROI = $[(110,000 - 50,000) / 50,000] \times 100 = 120\%$

The core team shall calculate ROI for five years. Additionally, they shall present the estimated P&L, or financial value, that the use case will offer the business in year five.

Why do we need to measure ROI at the onset of the AIO framework? We need to establish the quantitative financial benefits a use case can deliver (e.g., revenue gains or cost reductions), not merely qualitative benefits (e.g., the pain point it might overcome). Qualitative benefits must be converted to quantitative ones; for example, we must attach financial value to happier customers, more tasks taken on by staff, averted risk, etc., to justify investment.

Plainly speaking, establishing estimated ROI up front saves businesses from pursuing AI solutions that bring no or very low return. A 2025 McKinsey report states that eight in ten enterprises adopting new AI technology show minor revenue or cost savings (Sawaya et al., p. 1). This aligns with the UK's Department for Science, Innovation, and Technology's research with 3,500 businesses indicating that 77% do not observe top-line growth from AI initiatives (Department for Science, Innovation, and Technology, 2026, pp. 10 & 43) despite about half of these companies acknowledging a boost in employee output (Department for Science, Innovation, and Technology, 2026, p. 44).

Another important metric to include at this stage is the payback period, or breakeven point, for each use case. In Use Case X's example above, breakeven happens by the end of Year One with 37.5% ROI. A Deloitte survey (Horton et al., 2025, p. 5) notes that it can take "two to four years" to achieve ROI. The same survey also finds that only 13% of top-performing use cases see ROI within a year (Horton et al., 2025, p. 5). My perspective is that the more transformative an AI use case is, the longer it might take to realize its value. Estimating how long use cases will take to break even will give leaders another important data point when deciding which use cases to pursue.

Once we have worked out the ROI, P&L, and payback period for each potential use case, we plot each one in a table, as in Table 1. To illustrate, we will use case examples from stage 1.

Use case category	Use case description	ROI in 5 years [%]	Breakeven point [year(s)]	P&L for year 5 [£]
Automation (good-to-great payoff potential)	Generation of call summary, sentiment analysis and recommended next steps, and storage in CRM tool	110	1	330K
Augmentation (good-to-great payoff potential)	AI agent assists with underwriting data collection, analysis, pricing, and documentation	130	2	500k
Personalization (good-to-great payoff potential)	AI offers existing customers product recommendations grounded in customer data	175	1.8	1mn
Operational innovation (transformational payoff potential)	Human resource allocation prediction using machine learning (ML)	220	3	5mn
Business innovation (transformational payoff potential)	AI offers existing customers recommendations to lower their risk profile	300	4	25mn

Table 1: Illustrative use case categories and typical payoff potential, descriptions, ROI, payback periods, and P&L

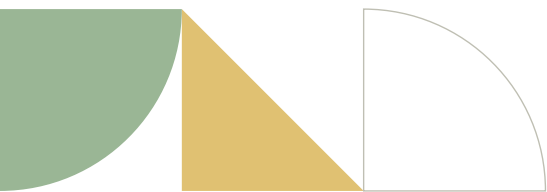


Table 1 notes:

- "Breakeven point" is the year when financial value gained from the solution overtakes investment cost inside a five-year rollout window
- "P&L for Year 5" is the estimated return at the end of five years
- If breakeven is not realizable over five years, consider removing the use case from the consideration set

AIO framework stage 2: Risk identification and mitigation

After we have worked out ROI and payback duration for each potential use case, two more steps remain before we can select use cases to proceed with. We need to enrich each use case with predictions and mitigations for its key risks.

Plenty of studies and literature can help us list typical risks that can arise from enterprise AI transformation programs. According to a report by the Department for Science, Innovation, and Technology (Department for Science, Innovation and Technology, 2026, p. 8), those surveyed cited data governance, AI output reliability, and ethics (potential job losses) as main concerns.

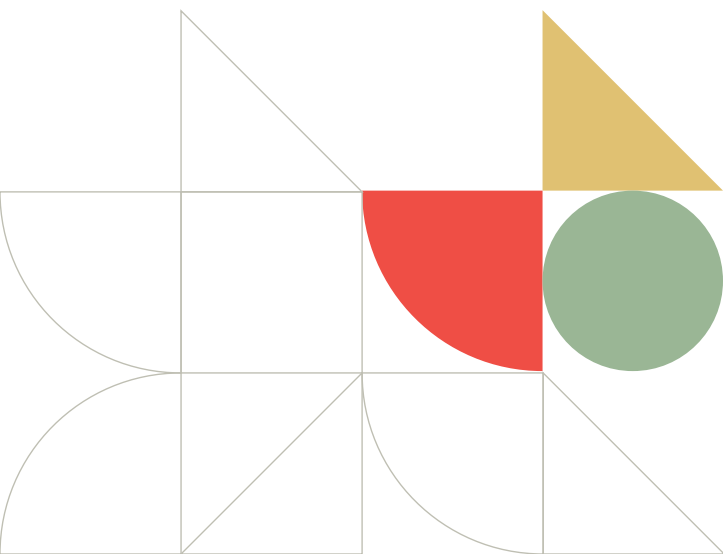
Research by the IBM Institute for Business Value states that "trust, bias, and explainability" (Boinodiris, Handa and Simons, 2025, p. 3) are the top factors blocking AI progress, according to over half of business leaders surveyed.

In his 2021 book "Scary Smart," Mo Gawdat offered a pessimistic view (p. 114): job loss attributed to AI will be a reality, and only those who know how to use AI will retain their roles. Now in 2026, the media is awash with news of an impending "jobpocalypse". The fear and risk persist.

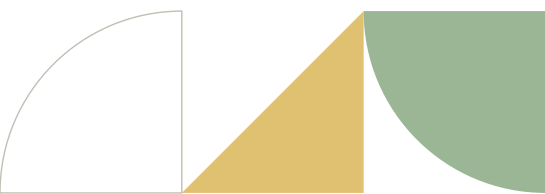
Informed by the above, we cluster risk into three broad categories:

- **Reliability:** Technical robustness, infrastructure scalability, AI model accuracy and explainability
- **Governance:** Data privacy, AI model bias, regulatory compliance
- **Societal:** Ethics, job displacement (job ceases to exist), job replacement (AI takes over the job)

Next, describe the risks for each use case, provide a 1 to 3 risk impact score, and outline actions a business can take to mitigate them. To illustrate this, we will make use of three use case examples described earlier.



Use case category	Use case description	Risk category	Risk description	Risk impact score (1-3, 0 if NA)	Risk mitigation
Automation	Generate call summaries, sentiment analysis, recommended next steps, and store them in the CRM tool.	Reliability	Incorrect recommended next steps might lead to lower customer satisfaction scores	2	Regularly assess AI output to maintain the reliability of next-step recommendations.
		Governance	Not applicable	0	
		Societal	Not applicable	0	
			Total risk impact score	2	
Augmentation	AI agent assists with underwriting data collection, analysis, pricing, and documentation	Reliability	AI agent provides hallucinated or significantly incomplete research output	2	Another AI agent checks the research agent's output to ensure it is trustworthy and sufficiently complete.
		Governance	AI is biased toward particular journals published by certain groups	1	Use Reinforcement Learning from Human Feedback (RLHF) to ensure the agent derives answers from a wider set of data sources.
		Societal	Not applicable	0	
			Total risk impact score	3	
Operational innovation	Human resource allocation prediction using machine learning (ML)	Reliability	Poor prediction might result in a drop in production of goods or customer service	3	ML input data monitoring for data drift (changes in data); carry out model optimization when required
		Governance	Not applicable	0	



Use case category	Use case description	Risk category	Risk description	Risk impact score (1-3, 0 if NA)	Risk mitigation
		Societal	Assess impact of ML job allocation on employees	3	Consult employees before ML model development begins to reduce negative responses to resource allocation when the solution is deployed. Clear and transparent communication with employees regarding how the ML model works and how work is allocated
			Total risk impact score	6	

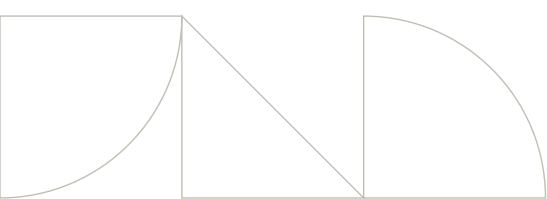
Table 2: Illustration of risk identification, impact scores and mitigation

Final output of the AIO framework

Now that stages 1 and 2 are complete, all that's left to do is to tag each potential use case with its total risk impact score. This will give us a high-level view of each use case's category, description, ROI, breakeven point, P&L, and risk level. For example:

Use case category	Use case description	ROI in 5 years [%]	Breakeven point [year(s)]	P&L for Year 5 [£]	Total risk impact score [0-9]
Automation	Generation of call summary, sentiment analysis and recommended next steps, and storage in CRM tool	110	1	330k	2
Operational innovation	Human resource allocation prediction using machine learning (ML)	220	3	5mn	6

Table 3: Illustrative final AIO output for two example use cases



The AI Investment Opportunity framework's final output enables leadership to assess use-case desirability across financial return and risk factors. Generally, the most desirable use cases have high return potential, reach breakeven faster, and lower total risk impact scores than other use cases in the consideration set. That said, don't rule out a very high-risk use case immediately; it might deliver business-transforming returns if successful, making the risk worth it.

Conclusion

The framework's output is not prescriptive. It helps leaders reflect and make an informed decision about which use cases to pilot, deploy, adopt, and exploit, grounded in quantitative data. You can use the AI investment opportunity framework as-is or adapt it to fit your organization.

AI use cases can be evaluated more effectively through clearer categorization, weighing risks, understanding what kind of ROI to expect, and how long it typically takes to see returns. The biggest takeaway is that by putting concrete numbers on the value of AI use cases, we can cut out human bias when deciding which ones to pursue.

Reference list

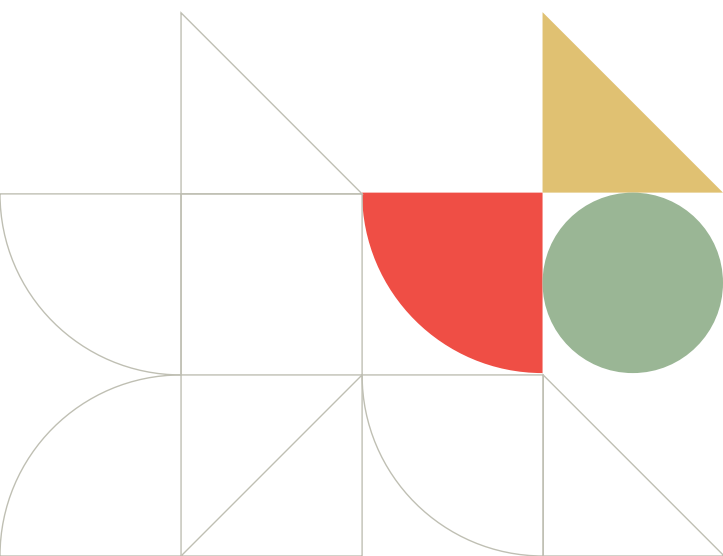
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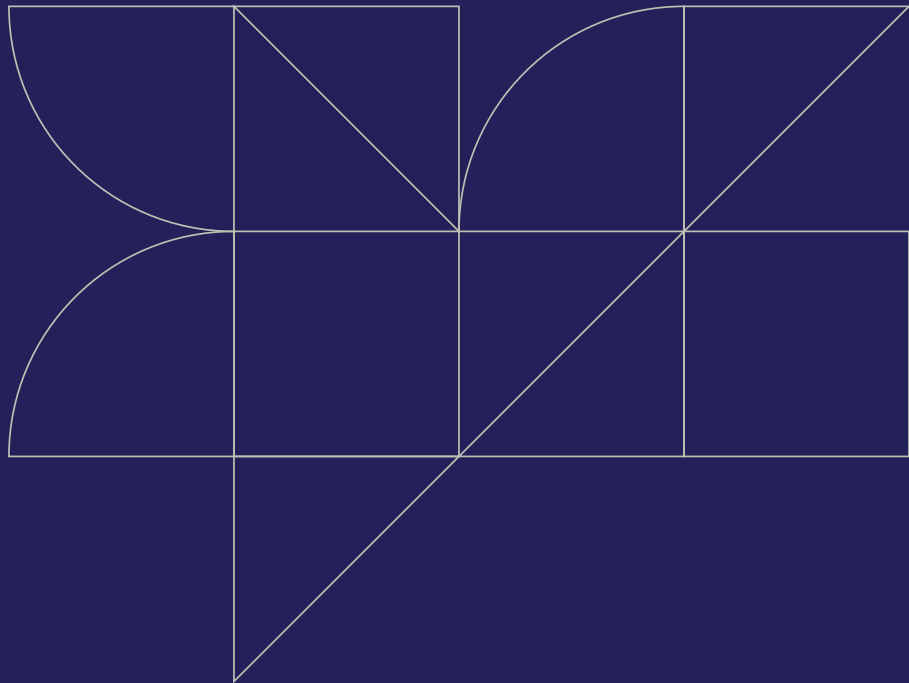
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