NTT DaTa

How AI can benefit business at banks and insurance companies

Net Consulting³
Empowering your Digital Business

**Advisory Services,
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Contents

Brief overview of artificial intelligence

Artificial intelligence (AI) refers to computer systems which are able to perform complex tasks that usually require the perception of humans.

In other words, AI technologies concern systems that can sense (analyse and understand the information received), think (analyse and understand the information collected by adding meaning and insights), act (take actions based on that understanding) and learn (improve their own performance by learning from what happened). See figure 1.

So, AI is comprised of many related technologies, some of which include:

Machine learning (ML): a subset of AI that refers to computer programs which analyse patterns and make predictions accordingly. Typical examples are internet platforms that recommend products or news stories to users based on previous preferences. By continuously analysing new data and scenarios, ML tools adjust decision-making processes without the need for specific programming, thus demonstrating their ability to learn from data.

Deep learning (DL): an application of ML where a model can analyse and draw conclusions from data and solve problems without being trained or given explicit instructions or frameworks. These models learn autonomously.

Neural networks: algorithms designed to mimic the human brain and recognise patterns in data. Using neural networks means that diverse data can be identified, classified and analysed, while patterns can be found that are too complex for humans to detect. Neural Networks are processes which classify data in successive layers and, in so doing, rely on the probabilities of possible outcomes. Decisions are made based on the most likely outcome, even though it ultimately might not be the perfect choice. However, neural networks involve a feedback loop. Depending on the accuracy of the outcome from previous trials, strategies can be updated to perform better next time.

Natural language processing (NLP): helps computers understand, interpret and respond in written text or speech. This technology is commonly used by chatbots.

Computer vision: intelligent systems can 'view' and recognise objects in pictures and extract related information. Such computer vision allows the automation of manual and cognitive routine tasks, like extracting data from written documents and pictures.
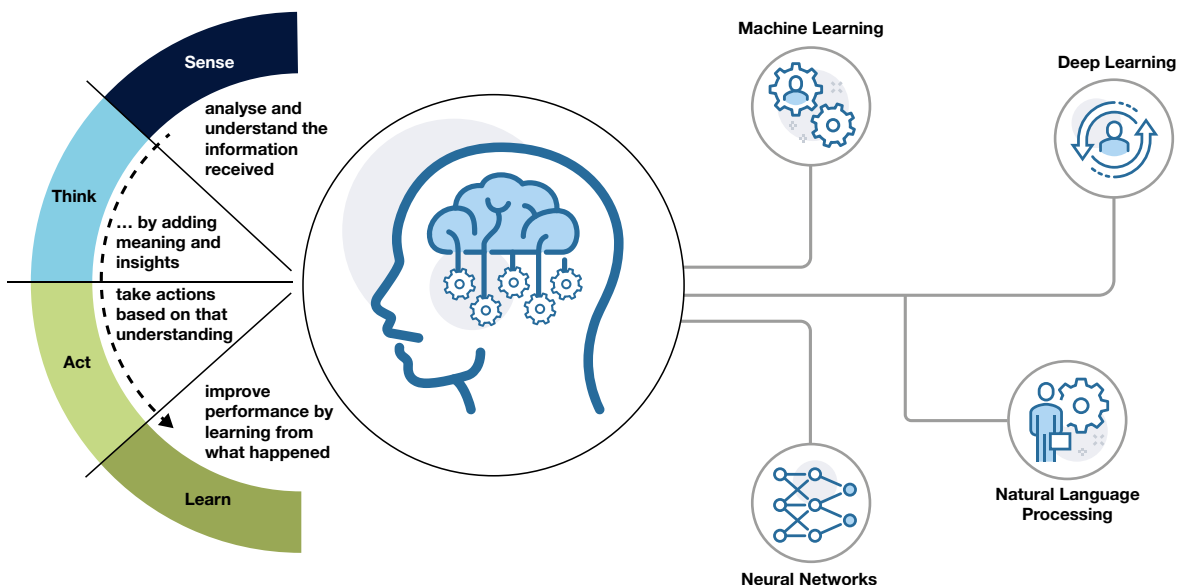

Figure 1: Artificial intelligence: meaning and elements   Source: NetConsulting cube, 2020

Main issues in the financial industry

The first digital transformation in the field of financial services was launched under the impulse of the 'new economy', introducing a disparate way of offering online banking services to customers through different channels (off-premises branches, mobile).

Changes in the financial services industry are being driven by shifts in customer behaviour, increasing expectations, channel proliferation, FinTech disruption, the adoption of new technologies, and the digitisation of business and social life.

Digital customers are also asking financial institutions to offer solutions with a high level of UX (User eXperience) and to create services competing with new providers of financial services (TPP - third-party providers).

Financial Institutions should no longer look for customer loyalty in order to maximise their profitability, but organise their offers according to a set of instruments and services that can satisfy the naturally changing needs of clients.

The main challenge in the banking industry is to improve the digital experience for customers (80%), and create tailor-made client services by integrating and linking distribution channels into one omnichannel experience that tries to match customer needs with the existing IT banking patchwork foundation.

Banking

Improve digital customer experience	78%
Enhance data analytics capabilities	65%
Reduce operating costs	60%
Digitizing back office ops	52%
Recruit and retain talent to meet changing needs	45%
Meet regulatory and compliance specifications	40%
Invest in and or partner with FinTech providers	12%
M&A	12%

Insurance

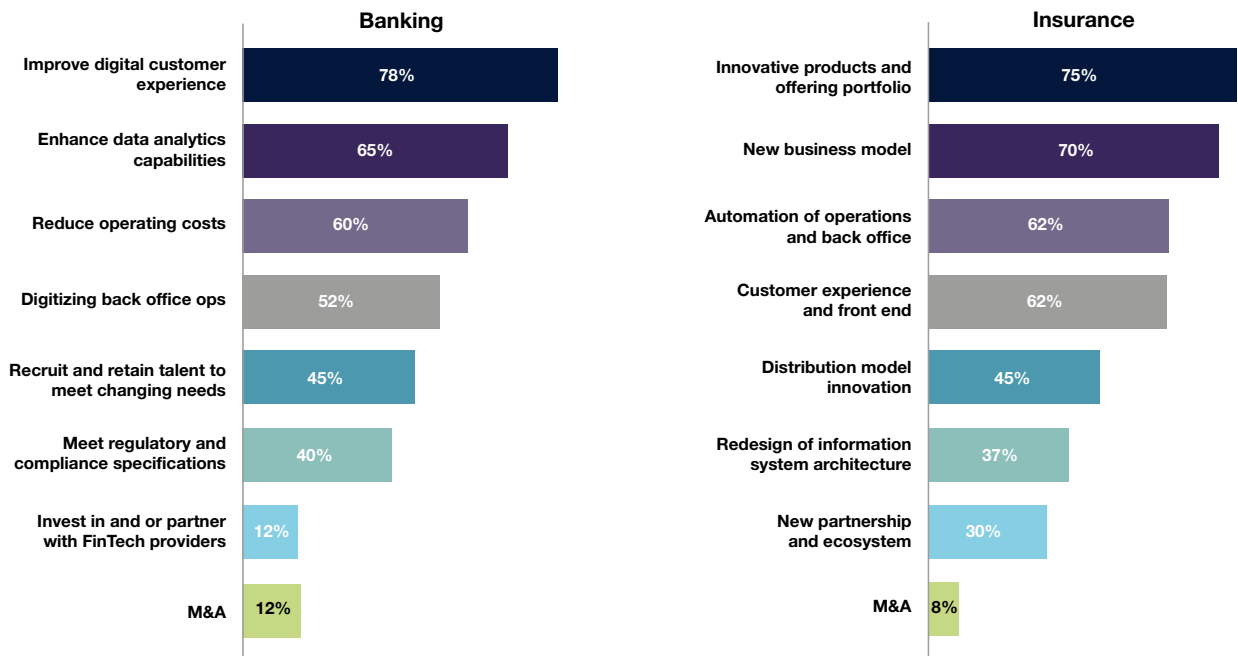|	
Innovative products and offering portfolio	75%
New business model	70%
Automation of operations and back office	62%
Customer experience and front end	62%
Distribution model innovation	45%
Redesign of information system architecture	37%
New partnership and ecosystem	30%
M&A	8%

Figure 2: Main goals and challenges in the banking and insurance sector

Source: NetConsulting cube, 2020

This challenge is connected to the enhancement of data analytics capabilities (a priority for 65% of those interviewed). While better use of data and advanced analytics can improve customer experience, it could also streamline operations and reduce operating costs (60%) through the digitalisation and RPA (robotic process automation) of back-office operations, for example (52%).

However, going digital affects the workforce too. Although automation can lead to employee reductions if they are not properly trained in the new technologies, it can also increase demand for data scientists. Therefore, in order to meet changing requirements, 45% identified the need to recruit and retain talent. Another major goal in the banking sector is related to being compliant with the increasing number of EU regulations issued in recent years, such as PSD2, GDPR, Anacredit and AML.

The Insurance industry is also facing a transformation - involving all divisions - that will re-define 'business as usual'. Increasing customer expectations are the main driver of this evolution process, followed by cost optimisation needs that have deep impact on processes and business models.

Manual paper-based processes, which are highly time consuming, need to be overcome through automation. Even today, customers are faced with laborious paperwork and bureaucracy when getting a claim reimbursed or signing up for a new insurance policy.

In this scenario, the main goals for the insurance industry are:

Innovative product portfolio: Insurance companies need to shift from standardised products, based on annual fees and contracts, to usage-based products tailored to customer behaviour based on individual patterns. This change will come through a new portfolio offering that is substantially disaggregated into micro-coverage elements (such as flight delay insurance and different coverage for home electronic devices) that consumers can customise to requirements.

New business model: The industry must switch from a 'purchase and annual renewal' model to a continuous cycle, alongside increased adoption of user-based insurance and behavioural policy pricing. Examples might include a pay-by-mile or pay-by-ride model for car sharing, and pay-by-stay insurance for home-sharing services.

Automation of operation and back office: Many core processes in the insurance sector are still paper-based and handled manually – from customer acquisition and on-boarding, to policy issuance and claims handling. The back office represents one of the most relevant costs for insurance companies, with thousands of people employed in data-entry and manual tasks. Insurers are addressing this problem by investing in RPA technologies applied to operational processes that concern on-boarding, policy issuance, claims, payroll and medical information, to list but a few. RPA represents the first step towards intelligent automation.

Improve customer experience and front end: Most client daily activities are online, digitised and convenient, but insurance contract subscription is not always a pleasant customer experience. Creating personalised client experiences has been a priority for many years, but now companies need to make it reality. Insurance businesses must improve their customer support services and enable a seamless automated buying experience. Adopting this strategy also means faster, customised settlements through an online process for claims. Here, the use of an AI engine makes it more efficient to settle and pay claims following an accident, while simultaneously decreasing the likelihood of fraud.

New distribution model: The main driver in distribution is digitisation, not only through direct channels for consumers, but providing smart personal assistants and new digital tools to help agents and traditional channels optimise their tasks and offer a more customised and effective experience. An omnichannel strategy, with the right balance between human and digital experience, will be the direction to take.

Redesign new information systems by replacing legacy and old applications with up-to-date ones and redeveloping IT architectures and data platforms.

New partnership and ecosystem: New business models are implemented through new partnerships with insurtech, the automotive industry, the health and medical ecosystem, utilities, and other actors in a new ecosystem enabled by API and data.
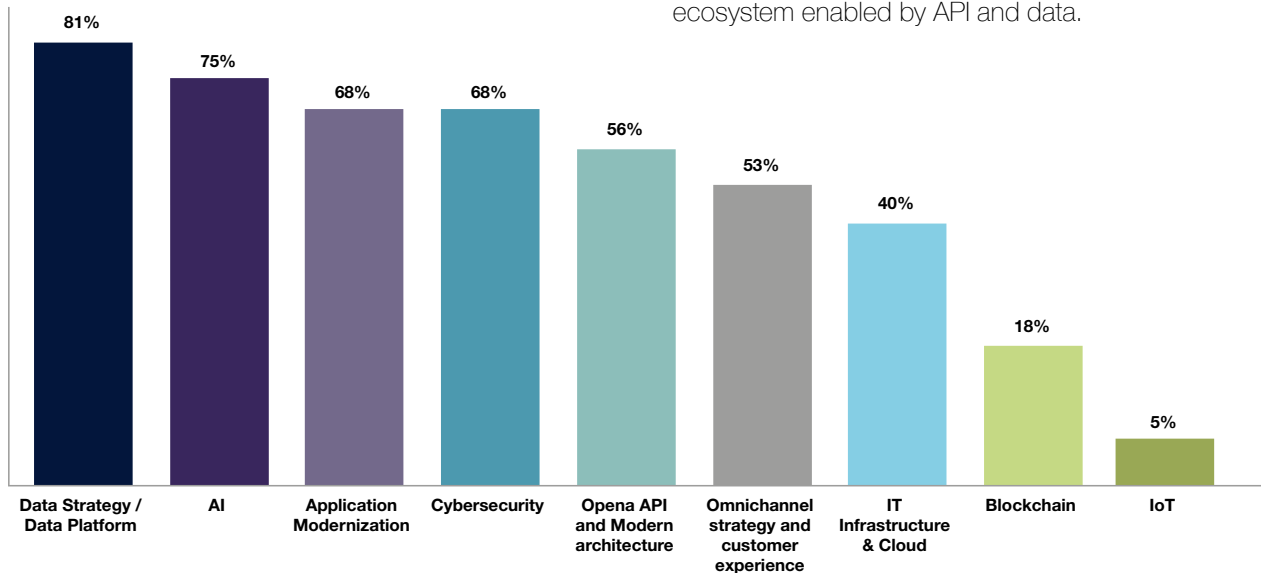

Figure 3: Trend forecast of IT priorities in banking

Source: NetConsulting cube, 2020

Data strategy and data governance represent the main IT priorities in the banking market. Some 81% of players are running projects involving data platforms to address the challenges of taking a unified view on their customers by ingesting all client data sets into a unified profile and storing them in a single data repository.

This trend is linked to the need of deploying AI algorithms, in which 75% of the European banking sector harbours an interest to invest. With a customer data platform, banking marketers could access insights for each client who interacts with the bank (such as their needs and preferred distribution channels) in order to improve customer satisfaction and retention.
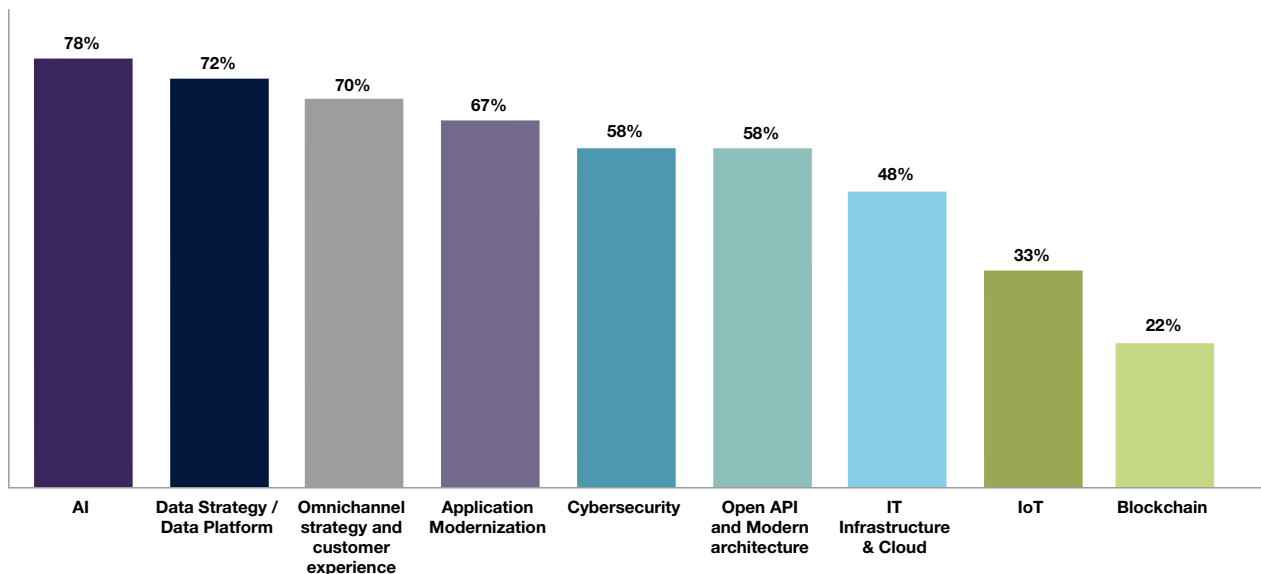

Figure 4: Trend forecast of IT priorities at insurance companies 2020-2021

Source: NetConsulting cube, 2020

A similar rate of maturity development is expected for AI as for RPA. For RPA, a wave of proof of concepts/initial developments had developed into a tide of enterprise-wide deployments across multiple use cases by 2020. As was the case with RPA, a wide variety in the rates of adoption for different types of AI will be witnessed, in particular for NLP, ML and DL.

In the Insurance industry, AI represents one of the top IT priorities and, in the next two years, 78% of companies will be undertaking projects in different areas, starting from proof of concepts/initial deployments and extending into enterprise-wide initiatives by 2021-2022. The use cases are different: chatbot for on-boarding or virtual assistant in client care to improve customer experience; tools that not only support agents in managing relationships with a larger client base, but enhance customer interactions (a mix of in-person, virtual and digital tools); underwriting by using advanced analytics and ML to develop more granular individual risk profiles; claims settlement; and fraud. These projects are strictly correlated with the new data platform that will collect internal data alongside a broad set of external data. In short, AI will allow companies to leverage the big moles of data they collect from every channel and source.

Business areas that can benefit from AI

AI solutions play a key role in the digital transformation of financial sector companies.

In banking, the business areas that can benefit most are:

Operations, in which the use of AI to gain efficiency is very high. Some 85% of European banks are going to invest in AI and RPA solutions to optimise their internal workforce.

Indeed, nearly the top 20% of **back-office** work accounts for 85% of the cost. Labour-intensive work like compliance reporting, new customer on-boarding communications and documentation can become highly accurate and efficient with AI-powered automation.

Data-driven innovation can also be applied in **credit-scoring** processes, whereby AI software can get a more accurate and faster credit rating for clients.

Therefore, in lending, the use of ML algorithms to analyse spending patterns and the behavioural data of customers can help banks have an insight into the client's creditworthiness and later monitor the early warning process. This approach also helps in giving pre-approved loans to a huge range of customers who want to obtain credit.

For SME and corporate loans, AI simplifies cash management processes, monitors whole credit lines, identifies potential risks by analysing market trends and the prospect's behaviour, and identifies even the slightest probability of fraud. Regarding **fraud detection**, while banks provide secure and swift transactions, AI can be deployed to detect transaction fraud or uncover any suspicious activity in the customer's account based on behaviour analysis. With an increasing percentage of cybercrime in recent years, AI can be used to maintain cyber-security and, most importantly, safeguard personal data. Ultimately, AI makes criminal detection faster and more cost-effective for banks.

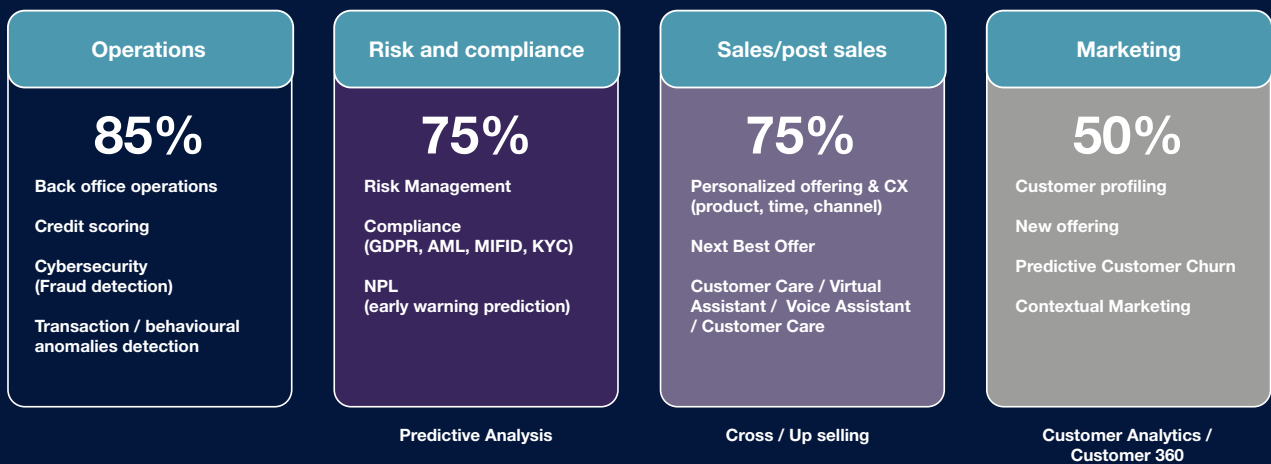| Operations	Risk and compliance	Sales/post sales	Marketing
85%	**75%**	**75%**	**50%**
Back office operations	Risk Management	Personalized offering & CX (product, time, channel)	Customer profiling
Credit scoring	Compliance (GDPR, AML, MIFID, KYC)	Next Best Offer	New offering
Cybersecurity (Fraud detection)	NPL (early warning prediction)	Customer Care / Virtual Assistant / Voice Assistant / Customer Care	Predictive Customer Churn
Transaction / behavioural anomalies detection			Contextual Marketing
	Predictive Analysis	**Cross / Up selling**	**Customer Analytics / Customer 360**

Figure 5: Estimated impact of AI in banking value chain

Source: NetConsulting cube, 2020

The second business area that can benefit from the adoption of AI technologies concerns **risk and compliance**. Three out of four banks insist that compliance is one of the main automation focus areas right now. The principal goal is to strengthen the functionality of internal control systems. Here, the evolving compliance scene (GDPR, MIFID, AML, CTF) means compliance officers in banks need to scour through thousands of websites and legislation documents to ensure that all the required regulations are being met. Failure to do so could lead to losses of banking licences. A new challenge called digital compliance is forcing many banks to invest in AI, RPA and NLP tools to assess and monitor risk in this area.

Other AI applications in the compliance realm concern early warning alert systems to monitor NPL: European banks are focusing on the early detection and reduction of credit default risks, thereby reducing the volume of actual defaulted loans. AI can also be a game-changer by detecting insider trading that leads to market abuse, or supporting the fight on counter-terrorism financing.

The **sales and post-sales** area was the first to implement AI solutions, specifically regarding the introduction of chatbots to support customer care service. Virtual assistants can interact through voice and text within the bank's mobile application or website, and the most advanced implementations concern solutions that enable personal finance management aimed at providing customers with better financial habits and effective budget management. This is an area in which banks continue to invest, with the main goal of attracting and retaining the next generation of clients. Specifically, 75% of European banks believe that AI is also able to support them in improving customer loyalty and retention - through a personalised offering - by leveraging big data and advanced analytics. To stay ahead of client expectations, financial institutions must harness the potential of existing data to create predictive and relevant insights, by delivering the right individual experience through the right channel at the right time.

Finally, banks are also using AI-related solutions to strengthen **marketing** strategies and provide quality, personalised advice to customers. Understanding clients is the foundation for sustainable competitive advantage and improving customer experience. However, banks must leverage the data available to adopt a 360-degree view of clients. With the help of advanced analytics, banks can gain insights to **customer segmentation,** the **evaluation of opportunities, new product and service offers, contextual communications delivery, and predicting customer churn**, thus strengthening engagements and providing a better experience.

Increasing competition from insurtech and insurance aggregators that do not have expensive agency distribution channels places high competitive pressure on incumbents. AI has great potential to: improve the insurance value chain; make many processes faster and more efficient through automation; help predict customer needs; detect fraud; and adjust claims values.

Operational activities, claims processes and settlements represent the more mature area of AI application for insurance companies, as these are the most labour-intensive, repetitive and uncomplicated tasks. The first stage of AI application in this business area is RPA; simply automating the more repetitive processes and achieving significant savings in time and money. Insurance companies first began investing in RPA to automate single tasks in 2017, before developing into enterprise-wide initiatives in 2019-20.

Online interfaces and virtual claims adjusters will make it more efficient to settle and pay claims following an accident, while simultaneously decreasing the likelihood of fraud. A next step being trialled by some companies is building robo-claims adjusters and DL models that can analyse images to estimate repair costs (see Ageas use case). Here, computer vision can be used in the verification of pictures provided by customers in car insurance applications. Such technology can, for example, validate the authenticity of images, extract information from documents like accident forms as a basis for claims triage, and automate claims processes.

The automation of policy processing and screening has been growing in recent years as it can take hours or even days if performed traditionally. In contrast, AI allows the whole cycle of policy management operations to be automated, including the issue of policies and order processing via various types of data-checking and fact-checking, such as fraud detection and credit analysis.

In policy management, existing policyholders can submit various update requests (address and telephone number changes, for example). ML can be used to extract inbound changes from voice transcripts, emails, faxes or other sources, and make all required changes in the documents and internal systems.

A broader application of automation in insurance policy management can also help transform further document-intensive operations, including the processing of loss run reports, analysing statement of value reports, communicating explanations of insurability evidence to customers, and other processes.
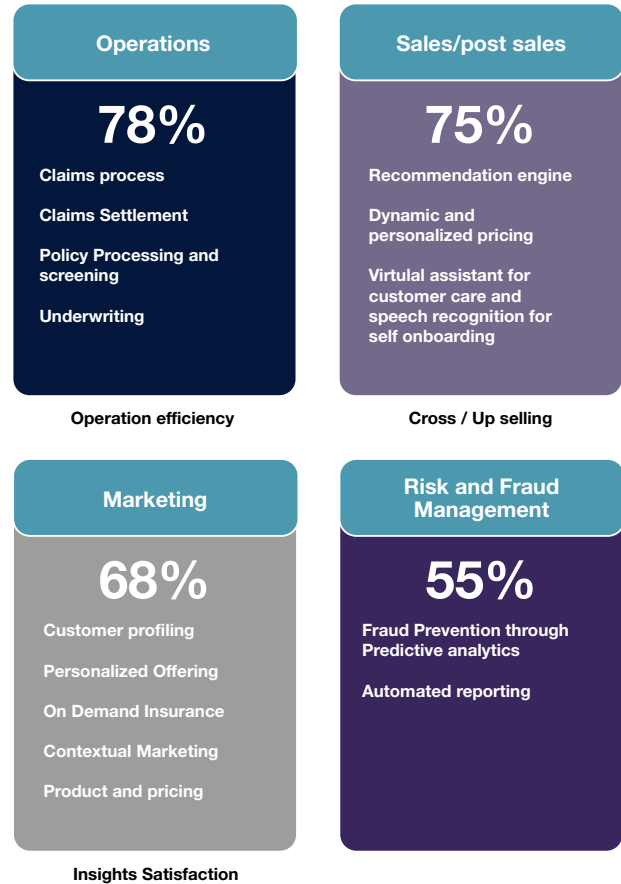
Operations	Sales/post sales
78%	**75%**
Claims process	Recommendation engine
Claims Settlement	Dynamic and personalized pricing
Policy Processing and screening	Virtulal assistant for customer care and speech recognition for self onboarding
Underwriting	
Operation efficiency	**Cross / Up selling**

Marketing	Risk and Fraud Management
68%	**55%**
Customer profiling	Fraud Prevention through Predictive analytics
Personalized Offering	Automated reporting
On Demand Insurance	
Contextual Marketing	
Product and pricing	
Insights Satisfaction	

Figure 6: Estimated impact of AI in insurance value chain
Source: NetConsulting cube, 2020

Regulatory compliance, which is a big issue for insurance companies, can be improved through AI because this eliminates the need for routine manual operations by reducing errors, ensuring the accuracy of data and keeping a tracking log of all operators. This data set allows insurance companies to monitor regulatory compliance in real time via internal reviews and be prepared in case of external audits. A few examples of time-consuming manual work that AI-driven RPA can automate include the research and validation of customer data, compliance checking, customer data security operations, and the generation of regulatory reports and notifications.

Underwriting is one of the processes in which AI can be time-saving and efficient as the majority of underwriting is automated and supported by a combination of ML and DL models. These models are powered by internal data, as well as a broad set of external data accessed through API. Information collected from devices provided by re-insurers, product manufacturers and product distributors are aggregated

in a variety of data repositories and data streams. AI supports the interpretation of risk data to provide actuaries with cutting-edge models for efficient risk management. These information sources enable insurers to make ex-ante decisions regarding underwriting and pricing that are tailored to the buyer's risk profile and coverage needs. For example, in car insurance automation and simulation, modelling can be used to understand risk drivers and expand the classes of automated and augmented underwriting.

Computer vision AI can also be used to automate routine tasks in underwriting and claims management by extracting information from documents and pictures, or to validate and verify information provided by the customer during the underwriting process.

In health Insurance, ML and DL can be used to understand the document type and extract the information photographed and submitted by policyholders. The system identifies the medical treatment and diagnosis, extracts all the medical bill data (amount, date, VAT number, fiscal code, receipt number) and, within seconds, matches the information with the policyholder's applicable insurance cover.

Sales: ML can be used to price insurance policies more competitively and support agents in recommending products to customers, thus being more respondent to their specific needs. Indeed, the use of AI can support the definition of product pricing based on individual needs and lifestyle, so that customers only pay for the coverage they need. This capability increases the potential client base and the satisfaction of existing customers.

In marketing, AI application mainly concerns customer profiling and segmentation. By analysing internal and external data, insurance companies can extract many customer characteristics, such as their hobbies, interests and life stages, in order to design products that better target their insurance needs. Insurers can improve profiling based on these attributes and use DL to predict the conversion rate of each segment. Most European insurance companies are already beginning to exploit social data to understand customer requirements and sentiments regarding products and processes. The next and more advanced stage is using data insights that anticipate the needs and behaviour of customers, thus personalising interactions and tailoring offers. In turn, on-demand insurance products are created that clients can customise for specific items and events.

Product and policy design: Through the collection and analysis of massive data sets from direct channels, TPP and agents, insurers can use ML to discover customer trends and interests in real time. These insights can then be used to develop and improve product and policy design.

Customer operations/contact centre: The use of chatbots and speech recognition tools has been the first AI application area at insurance companies looking to help client care operators understand and answer the bulk of customer queries over email, chat and phone calls. Using AI in this way can free up significant time and resources for insurers, which they can deploy towards more profitable activities. Widely spread chatbot applications can be seen in on-boarding or supporting claims process.

Risk evaluation: AI enables insurers to enhance risk quantification accuracy. As a result, insurers can better segment customers based on their risk profile and continue processing large amounts of data in a reduced time and with greater accuracy.

Fraud prevention and risk prevention: Predictive analytics and neural networks can be used to recognise fraud patterns and reduce fraudulent claims. By analysing the claims based on set rules and indicators, AI can identify which may not be legitimate. These indicators can include frequency of claims, past behaviour and credit score. The adoption of AI in risk prevention is at early stage.

The adoption of AI in finance

Actual use cases in the banking sector

HelloBank: KYC and on-boarding process

Online account opening and customer on-boarding require different steps: KYC controls; validations in external systems; and administration steps in the central back-office information systems of the organisation's headquarters.

BNP-Paribas, in relation to its HelloBank online banking platform, has optimised KYC and activation processes by automating controls and robotising its validations. Also, integration was provided by a feature of next best action (NBA) to support operators in real time.

The solution selected is a robotic assistant to automate end-to-end KYC control tasks and systematise validations. This assistant is connected through API to many third-party applications and data sources, such as from the central bank or others, to provide a comprehensive report on the subscriber's eligibility.

Moreover, the creation of a real-time contextual banner (dynamic panel) on the workstations has allowed quick appropriation and live assistance through NBA guidance. The result is an acceleration of the process with improved user experience and a relevant reduction of errors. Operator efficiency was dramatically improved: the robotic assistants support the operator by proposing the right decisions while releasing him or her from redundant tasks.

The advantages gained concern an increase in the effectiveness and efficiency of agents, a controlled evolution of the information system, an improvement of the success rate related to customer account activation, and a dramatic reduction of the average handling time for the subscriber KYC and account activations.

Benefits measured:
- Time to market: 6 weeks
- Average handling time: -80%
- Average response time: -90%

Danske Bank: Fraud detection

Danske Bank, the largest bank in Denmark, uses DL to identify fraudulent activity. The bank's old rules-based fraud detection system only had a 40% success rate and generated 1,200 false positives per day: 99.5% of

Figure 7: AI use cases in banking industry
Source: NetConsulting cube, 2020

suspicious cases the bank investigated proved not to be fraudulent. These dead-end investigations required time and resources that could have been used to combat actual fraud.

The decision was therefore taken by Danske Bank to implement a DL tool that has increased fraud detection capability by 50% and reduced false positives by 60%. Furthermore, the system automates many decisions, while routing some cases to human analysts for further investigation.

To detect anomalies, 'champion/challenger methodology' is deployed, which is very sophisticated and self-improving: each model (challenger) learns transaction characteristics indicative of fraud and is fed additional data such as customer location to improve accuracy. When one model beats another, it becomes the 'champion' and helps train other models. Moving forward, this process of improvement likely repeats.

Banca Mediolanum: Recommendation engine

Looking to experiment with an advanced analytics approach, Banca Mediolanum launched a data analytics laboratory initiative in 2018 for the development of advanced data analysis mechanisms and the design of proactive services, tailored to customer needs. Banca Mediolanum is carrying out a project related to the development of a platform for the analysis and synthesis of automated recommendations aimed at providing personalised commercial product offers.

The recommendation engine enables the identification of a number of users carrying out certain purchase sequences of the same products, allowing the anticipation, prediction and suggestion of the next best offer for the customer.

Three principal uses can be listed:
- Estimating the propensity of individual customers to make purchases and, on this basis, extracting target lists for targeted commercial campaigns
- Supporting the sales force with actionable targeted recommendations from CRM dashboards during customer meetings
- Managing campaigns in real time, accessible directly by customers via online channels such as touchpoints

Implementing the computational model facilitated the development of a pilot case, which was evaluated using selected customer data observed at a given t0. For each of the selected customers at that date, the analysis was based on a snapshot of the products in the portfolio, and demographic data like age, commercial profile and asset class. Subsequently, a series of recommendation models based on ML algorithms were tested on this customer base.

Solutions were configured with different parameter settings in order to facilitate a comparison and experimentally verify the effectiveness of the results. The figures showed a marked improvement in precision, up to +167%, and in recall, up to +974%.

BBVA: Customer financial health (Bconomy)

BBVA is leveraging advanced analytics methods and technology to give users full control over their data and help them understand their financial health to make better decisions.

The BBVA mobile app and website has been integrated with Bconomy, a function of automated and assisted saving that not only allows customers to know the state of their financial health, but provides made-to-measure plans to improve it. This tool measures the evolution of income and expenses, the level of savings, and spending on housing and debt levels to calculate an average rating of the customer's financial health. In addition, Bconomy assists customers with personalised recommendations and tools according to their situation.

BBVA aims to provide its customers with all of the information needed on their financial situation to facilitate decision-making. Bconomy allows customers to know how they are managing their finances and identify ways to improve certain aspects.

ING: Wealth management and portfolio management (Katana)

In 2018, Dutch banking services provider ING developed an internal AI tool called Katana, which uses predictive analytics to help traders decide what price to quote when buying and selling bonds for their clients, based on historic and real-time data.

AI is applied to enhance the decision-making abilities of traders, allowing the use of natural intuition and expertise to offer the best quote.

Katana has combined data visualisation with AI algorithms to bring all relevant information to one screen so the trader can see what is needed. This information includes historical trends, current trends and projected data trends, providing context that allows traders to make decisions quickly and more efficiently.

The project initially rolled out with a small amount of users, but with its growth is showing many potential benefits.

In the first results of testing, Katana showed faster pricing decisions for 90% of transactions; a 25% reduction in trading costs ; and traders able to offer clients the best price four times more frequently.

Insurance industry use cases

Zurich Insurance: Claims process

After trials, Zurich Insurance (Europe's fifth-biggest insurer) deployed AI in deciding personal injury claims and has cut processing time from an hour to just seconds. The pilot was run in the UK and focused on medical claims reports, with the following benefits:

- From 58 minutes taken by a person to process the claims, to only three minutes with AI
- Fewer mistakes and significantly increased quality of claims and reporting

According to the company, 40,000 work hours were saved.

In claims management, Zurich Insurance completed a test in which it processed non-emergency home and motor claims using an AI-powered chatbot called Zara. 'She' could log the policyholder's initial query at any hour, seven days a week, before passing it to a human claims handler.

Generali: Semantic engine in claims processing

In 2018 Generali Spain implemented a semantic engine to classify large volumes of unstructured information. During the first stage, the project will focus on registration and claims processing, however, the plan is to extend the application of this technology to other business areas. The project will allow the automatic classification of approximately 1 million emails that the insurance company receives every year in areas involving its customer service. Information will be classified based on management criteria that includes more than 200 categories, with the system also detecting if any required documents are missing. Notably, the system can automatically redirect the request to the relevant department, and it can read, understand and respond to the user's needs to improve and increase decision-making. The software is designed to work autonomously and faultlessly, 24 hours a day, every day of the year. This process saves considerable time and cost, allowing the company to offer better customer service as it accelerates all processes that form part of its daily business.

Operation

ZURICH
GENERALI Spain / ageas

Machine and Deep Learning deciding personal injury claims after trials

Semantic engine in Claims processing

Computer Vision Claim management and evaluating

Sales/Post sales

Allianz ⑪

Semantic engine Virtual Advisor for Agents' Network

Risk and compliance

GENERALI France

AI in Fraud Prevention in detecting anomalies and claims automation

Marketing and product development

Allianz ⑪

Machine learning for Personalized travel Policies

Figure 8: AI use cases in insurance companies
Source: NetConsulting cube and other sources

During 2019 Generali France implemented AI to detect anomalies in claims files in real time, to analyse them and achieve faster processing of those that are not fraudulent. Every year in France, 125,000 claims are filed with Generali, around 300 of which turn out to be fraudulent. In 2022 it is expected that 600 fraudulent claims will be filed. Property damage insurance for companies and private individuals corresponds to approximately 30% of P&C claims received by Generali France in terms of amount and volume. The detection and organisation methods for processing suspicious files result in 0.7% of damage claims being recognised as fraud, while the most successful insurers on the market have a rate of 2% and Generali aims to reach this target.

"What Generali wants is to detect anomalies in claims files in real time, so as to analyse them and achieve faster processing of anomalies that are not really fraudulent," says Jérôme Burtheret, Head of Control and Reimbursement Policy at Generali France. From the moment a claim is filed, the algorithm can combine thousands of variables and identify incoherencies among the data relating to the claim and context.

These include:
• Systematising the verification of every invoice
• Utilisation of images in analyses, notably the capture of aerial images via Google Maps

The solution adopted draws its data from two sources.

Data delivered by the insurer:
• Claims data
• Contracts data
• Sample copy

Third-party data (Government data, company data, demographics):
• Web (Google)
• Aerial imaging (Google Maps)
• Geolocation
• Forecast

Automating part of the fraud detection process for property damage accelerates the processing of claims, saving time for both the insured and insurer. AI will be able to assess the files erroneously detected as fraudulent and exclude them from the files pending attention. This capability is advantageous because it is estimated that automated fraud detection for property damage insurance gives a false positive rate of 89%, which is high in comparison with the percentage of recognised fraud. After the analysis has been completed, the administrator will check whether there has been any fraud and will be able to pay the policyholder more quickly and easily.

Around 3,000 claims per day will be analysed, with analysis taking place several times at each stage of the claims process.

Allianz: Digital advisor
Allianz Italy has developed a new digital advisor, Allianz Virtual Advisor, which since 1 July 2019 has been part of the company's digital ecosystem for its agent network. Allianz Virtual Advisor will answer insurance agent questions via voice or typing through the NLP system. The digital advisor will offer live advice to agents and monitor their business activities anywhere, supporting data-driven decisions in real time instead of relying on technical solutions accessible by a small percentage of the workforce.

Allianz Travel Insurance: Personalised products
Allianz Travel Insurance added ML and AI technology to offer real-time personalisation that delivers the product recommendation in less than a second. The goal is to ensure that travellers get the most appropriate product for their trip and do not overpay for coverage.

The company set out to deliver "the most appropriate" products within a partner booking path in less than a second, and to answer questions about the reliability and availability of its products. Allianz partners include airlines and online travel agencies that sell coverage as an add-on during the booking process. To pull it off, the company embraced contextual personalisation to consider several factors for the trip. These included: the booking window, as the period between booking and departure is a critical factor; trip length; airport code; connecting flights (itineraries with connecting flights are more likely to experience travel delays or cancellation); and obviously trip cost.

Allianz also identified other variables that could feed its ML algorithms. The ML systems take all these factors into account, meaning that buying an insurance policy through an airline or online travel agency might be a traveller's top choice.

Ageas: Claim management and evaluation process
Ageas, a UK insurance company, is using an AI solution based on computer vision (developed by technology company Tractable) to support the evaluation of vehicle damage based on photos provided by repairers, appraisers or policyholders. Through its platform, Tractable's AI shares damage estimates and guides the process to ensure each claim is handled and settled as quickly as possible. For example, the AI identifies which parts of the vehicle have been affected and to what extent, and generates a full estimate including recommended repair, paint and blend operations, as well as costs and labour hours. As a result, by submitting photos taken by a smartphone as they report an accident, policyholders can receive decisions on the next steps from Ageas within minutes – even while they are on their initial phone call to the insurer.

After successful UK trials in 2019, Ageas and Tractable will now scale the use of the technology to resolve thousands of claims every month. This is the first time that a UK insurer is using AI to generate end-to-end estimates.

AI technology implementation in documental systems and text analytics engines

A useful application of AI in the business world is to support the internal documentation system of a company. In this area, NTT Data has developed a text analytics engine based on ML algorithms able to analyse documents, generate contracts, create summaries and perform other tasks within the text analytics space.

By allowing end users to quickly search for complex patterns of words, such as a particular set of information in a corpus of documents, the engine can identify facts, relationships and assertions that could otherwise remain buried in the mass of textual big data available in a company.

The engine, integrated in a wider offering related to a document management system, enables several micro-services to help an end user improve his work (usually a project manager). Among the main features of NTT's text analytics engine are:

- **Document summaries** – the system summarises a document in a few lines in order to help understand its most important points.

- **Extraction of keywords** – useful when end users need to judge a sentence in a few seconds by looking at keywords. The same feature could be applied to understand and categorise documents.

- **Extraction of topics** – enables the understanding of the document(s) main topic for classification purposes.

- **Entity similarity** – improves the understanding of which texts are similar to each other in order to read similar documents, group them or understand if two different contracts are similar.

- **Extraction of deadlines** – allows contract deadlines to be controlled and not exceeded.

- **Document generation** – automatic generation of several types of standard documents to save time and be sure that all are compliant.

- **Document translation** – supports the end user in translating a document in different languages to deal with people of different nationalities.

- **Text extraction from images** – enables the end user to extract text and key information from an image.

Benefits and risks related to AI implementation

AI implementation can generate different benefits for the banking and insurance industry.

Better fraud detection and prevention

The finance industry is extremely vulnerable to hacks and scams, which is why fraud detection and mitigation is the top priority among banks. AI plays its role in decreasing false positive rates, preventing fraudulent attempts and reducing payment frauds. Moreover, AI can prevent fraud before it happens. Relying on cognitive fraud analytics, AI observes customer behaviour, tracks transactions, recognises dubious activities and keeps up with suspicious accounts. Through supervised ML, AI can interpret trend-based insights which, joined by completely new knowledge gained through unsupervised ML, enable AI to determine whether a transaction is fraudulent or not.

Digital compliance

As the cases of frauds and scams increase, banks come under growing pressure from regulatory bodies. Via DL and NLP, AI can help compliance managers to better remain up to date with rules and regulations by going through the compliance requirements and detecting any changes. This capability enables banks to remain abreast of ever-evolving regulatory requirements and align their own regulations accordingly.

Reduction in costs

Cost reduction is a huge advantage of integrating AI in the banking industry. Most time is spent on identifying, digitising and on-boarding document templates. Through intelligent automation, semantic tools and visual AI, banks can reduce the time and revenue spent on this process. Human error, which is both costly and unavoidable, is unfortunately one of the leading causes of financial data breaches. Since AI is a lot better at handling unstructured data, error rates are reduced and, subsequently, the cost to resolve that error is saved.
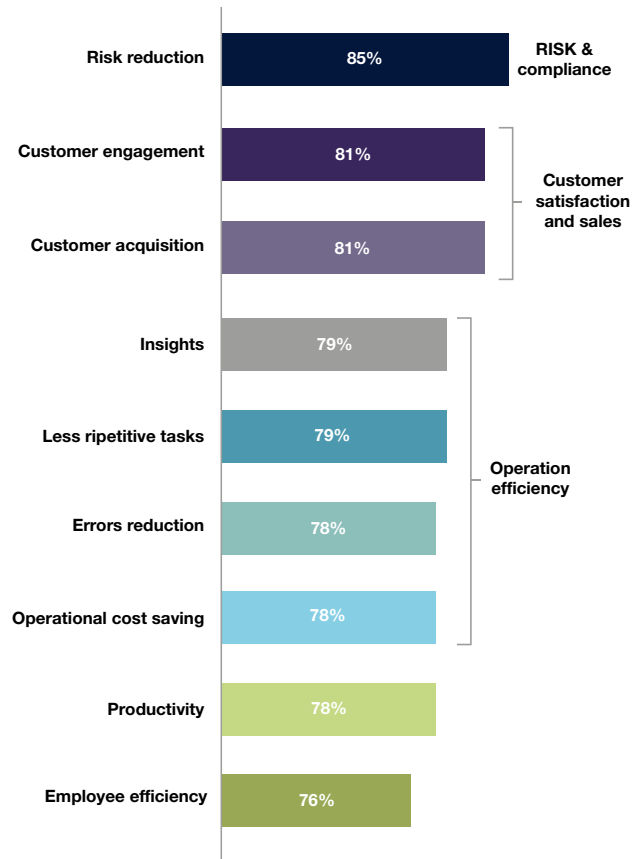

Figure 9: Benefits from AI in the financial industry
Source: NetConsulting cube on Forbes Insights, 2020

Enhanced customer experience

Being a key driver of each industry, customer service is at the forefront of any business. AI can be used to gain a better understanding of client spending patterns, which helps banks to customise products by adding personalised features. This strategy provides meaningful client engagement, builds strong relationships and business growth for the bank, and gives assistance to customers that reduces the response time to problem solving.

Benefits for insurance industry

Analysing the actual and perspective adoption of AI in the insurance industry, the benefits can be grouped in three different clusters:

- **Risk and compliance**
  Some 85% of insurance companies consider risk reduction and more efficient compliance operations as one of the main benefits generated by AI adoption. Processing large amounts of data in a reduced amount of time, AI supports faster model processing and enhanced risk quantification accuracy. Even fraud prevention, a hot topic in the insurance landscape, has gained improvement through AI with the adoption of fraud detection algorithms and investigation systems. Multivariate analysis of data and real-time detection of fraudulent activities are the main investment topics. Benefits include a reduction in human error and the mitigation of resulting imprecisions by identifying data patterns in underwritings and claims.

- **Customer satisfaction and engagement**
  AI shows significant potential to enhance client engagement by increasing the new ways of performing customer acquisition. Making effective use of AI will allow insurers to determine which leads can potentially result in a deal and suggest actions to acquire new clients or support upselling. Besides, conversational agents are deployed in different parts of the value chain, allowing customers to interact with their insurer 24/7 via online chat.

  Using DL techniques to classify input in natural language, conversational agents can identify and respond to complex client queries. The result is enhanced customer experience, as well as increased insurer efficiency by processing large amounts of client requests.

Conversational agents may perform different types of roles, from guiding users to the information they need, to supporting them through insurance-related procedures, such as submitting a claim.

- **Operational efficiency**
  Operational efficiency has been one of the main outcomes since the first application of RPA to automate tasks like data entry and reconciliation, e-mail classification, and document analysis.

  Automated claims processing reduces the amount of manual work by 80% and improves accuracy significantly, cutting the time necessary for the process by 50% and thus allowing companies to process twice as many claims with the same personnel. Customer experience is therefore improved as the back-office functions are performed faster and with fewer errors, delays and annoying back-and-forth communication with clients.

  AI can free-up time for commercial and customer service staff, thereby enabling enhanced client services and more effective allocation of resources.

  NLP can also help insurers respond to customer queries and find relevant information from the huge number of documents they must review in claims settlement. An example is Lloyd's International Trading Advice (LITA), a consultancy within Lloyd's that gives insurance companies regulatory information about the countries in which it operates (more than 200). The regulatory rules of each nation are registered in lots of unstructured documents that previously took several days to be analysed in order to solve a legislative or compliance query. To optimise the process, the LITA team used all the data they had gathered through their past interactions with customers to train a question-answering AI model. The team was able to develop a system that automated a large part of the consultation process, improving the service-level agreement from five days to less than an hour.

But there are also some risks associated with AI:

Algorithmic bias: ML algorithms identify patterns in data and codify them in predictions, rules and decisions. If those patterns reflect any existing bias, the algorithms are likely to amplify that bias and may produce outcomes that reinforce existing patterns of discrimination.

Overestimating the capabilities of AI: Since AI systems do not understand the tasks they perform, and rely on their training data, they are far from infallible. The reliability of their outcomes can be compromised if the input data is biased, incomplete or of poor quality. As part of insurance underwriting, just like in banking loans, intelligent systems need large amounts of data to learn. However, the learning of intelligent systems is only as good as the data used to train them, so the risk is that any potential bias in the data will be learnt by the system.

Programmatic errors: Where errors exist, algorithms may not perform as expected and may deliver misleading results that have serious consequences.

Risk of cyberattacks: Hackers who want to steal personal data or confidential information about a company are increasingly likely to target AI systems.

Reputational risks: AI systems handle large amounts of sensitive data and make critical decisions about individuals in a range of areas, including credit. So, any system that is biased, error-prone, hacked or used for unethical purposes, poses significant reputational risks to the organisation that owns it.

Moreover, due to the complexity of AI, it may be difficult to understand why a system has reached a decision. Much like humans, intelligent systems can make errors even when the data is not biased. Known problems in computer science that can lead to errors include overfitting or the so-called curse of dimensionality, for example. In such situations, patterns learnt from the data cannot be generalised. Human decision-making is not free from bias and errors. However, in contrast to decentralised human decision-making, the use of AI for autonomous decision-making at scale implies that even a small systematic error may have far-reaching consequences (The Geneva Association 2018).

Discrimination is another the risk related to AI application. Algorithms scan factors to identify clusters of risks, but these conclusions may unintentionally discriminate. There are already many examples where AI algorithms have inadvertently amplified stereotypes.

Opportunistic pricing: There is also the prospect of more individual discrimination. Already quite well known is the problem of genetic discrimination – the risk of a health or life insurer increasing premiums or even denying cover based on what an individual's DNA reveals about genetic dispositions to certain conditions.

All the risks described can be mitigated and reduced by designing an appropriate AI strategy.

How to the define an AI strategy

Like any business transformation, implementing innovative AI solutions requires the most suitable approach to be defined, along with identification of the right technology to drive the change. In this context, the design of an effective AI strategy is the key factor to pursue business objectives and priorities. In fact, there are several aspects that must be considered when aiming at designing smarter business processes, at automating operative functions or at creating intelligent products like those described in previous paragraphs.

The importance of data

First, AI is based on data. No matter what algorithm or implemented technology is conceived for the specific solution, 100% of cases require data to train, validate and test the algorithms, and to feed them once the solution has been deployed in a production environment. It is then important to have a data set with the appropriate characteristics, such as correct labelling of variables, minimum number of biases, a high degree of accuracy and homogeneity. These features maximise the outcomes of data science and AI activities because they underlie standard behavioural patterns for each variable used by the AI algorithms.

In a sense, data sets are now a real company asset. As such, data sources must be accessible, interoperable, reusable and secure since the majority of AI applications in insurance and banking are likely to affect consumer protection and privacy. With this thought in mind, a good starting point for the data governance and data management assessment is to review the current characteristics of data sources in accordance with the business cases under analysis, for example by realising a data inventory and identifying a roadmap towards an effective data strategy. This approach not only allows a solid understanding of the data resources and information available, it helps determine further data-driven AI opportunities. For instance, insurers may want to use the behavioural data of customers collected from a mobile app developed to automate claims processing, as this could provide insights on client habits and preferences. The company can then use that information to identify targeted insurance needs, or banking products tailored to the customer profile for a marketing campaign. In a nutshell, the definition of a one-size-fits-all data asset approach to support and test many different use cases and guarantee high-accuracy performance is one of the main ingredients of an effective AI strategy.

Awareness is a crucial factor

A further question to take into consideration is the company's AI maturity level. From a technical viewpoint, any automated AI solution is linked to a specific architectural solution which must be integrated into the existent company IT infrastructure. Sometimes, it might be required to process data in (near) real-time mode. As an example, consider the speech-to-text algorithms involved in customer contact centres using chatbots: these systems must respond promptly and appropriately, depending on the specific request (or claim) submitted by the customer. In other instances, the focus is more on computational power, like when asked to process hundreds of data sets by performing and monitoring multiple algorithms to run forecast models in parallel. The two scenarios encompass different services and resources, as well as data streaming, data processing and ML training modalities.

Nowadays, the AI market offers many products and platforms to guarantee higher computational power, modulate memory capacity, access cloud computing services, run algorithms faster and share resources on demand. However, the choice among different options is not only a technology matter. There could be many other external and internal factors playing a key role in the definition of the AI solution. The IT legacy infrastructure is one of those: for an existing company, the transition from a traditional IT system to a more digitalised one is a long process that is likely to involve different departments and impact several business processes. In this scenario, some systems are just hard to replace, and the targeted solution must continue to support their usage and integrate them in the final design. Several consulting firms confirmed that the biggest barrier to digital innovation in the insurance domain is not technology or data, but skill shortages at different levels. On one hand, business leaders may not be proficient enough at understanding AI technology to guide the change management and integrate its paradigms in their business processes. On the other hand, field users may not be digitally skilled or prepared to accept intelligent solutions in their daily working activities.

NTT data has extensive experience in the AI solution advisory business. The company has proven time and time again that it can identify effective approaches to help organisations deploy AI. As a first step, such an approach requires the generation of a company maturity level assessment report. This document includes a deep and structured analysis of the main issues, and paves the way toward the definition of an effective AI-strategy that guides all phases of the project's development.

Roadmap process, impact on organisations and the re-engineering process

AI adoption in the enterprise is a journey. In order to implement an AI solution, it is necessary to define a path and a start-to-end model that help maximise the value of AI projects. Here is an effective FOUR-step approach to deploying AI in banking and insurance businesses.
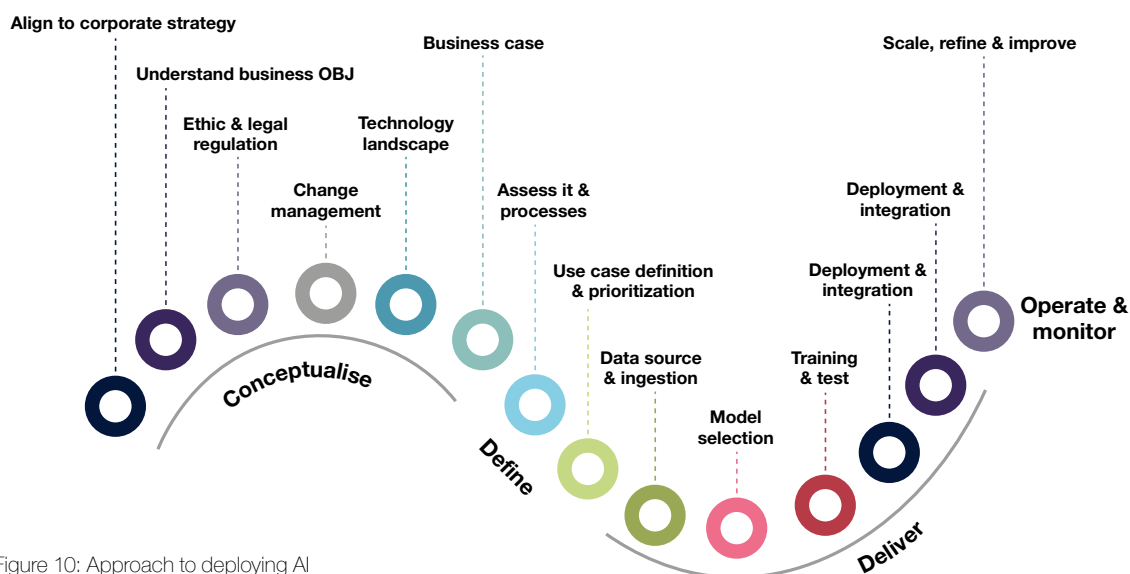

Align to corporate strategy

Understand business OBJ

Ethic & legal regulation

Change management

Technology landscape

Business case

Assess it & processes

Use case definition & prioritization

Data source & ingestion

Model selection

Training & test

Deployment & integration

Deployment & integration

Scale, refine & improve

Operate & monitor

Conceptualise

Define

Deliver

Figure 10: Approach to deploying AI

Step 1 - Conceptualise

Companies must define their overarching AI strategy by gaining a deep understanding of their internal business and their users, as well as the technological landscape.

Align to corporate strategy: Understand the in-house maturity level in AI and make a critical assessment of the existing position in order to move to the next level and realise real benefits. A maturity assessment should be performed based on key dimensions that include:

- **Data:** AI depends on data and the interactions of algorithms, so when it comes to AI business cases and plans, success is largely conditional on robust data and analytics infrastructure.

- **Technology:** Comprehending the types of AI technologies and capabilities in use/planned, along with the stage of AI implementation and degree of integration, helps a company to determine how fast it can plan, implement, maintain and adopt AI in its digital transformation journey.

- **Organisation and culture:** These factors directly impact readiness for AI-based solutions in terms of skills available to support AI, ability to understand AI methodologies and algorithms, level of understanding and acceptance of AI, and the propensity for organisational change.

- **Operations:** Understanding customer acceptance or expectations from AI products or services - and how AI is being used in specific internal operations, B2C or B2B scenarios - enhances customer care and sales and marketing engagements.

- **Strategy:** Comprehend the long-term objectives, the state of AI strategy and how AI fits into a wider digital transformation strategy.

Understand the business objectives: Assess which business outcomes would benefit most from AI and evaluate how AI might help achieve those goals. Determine which KPIs should be driven by implementing AI solution capabilities. See chapter 3 for the most common AI applications best suited to banking and insurance services.

Ethics and legality: There are lots of ethical and legal considerations around AI. For example, whatever way AI is deployed, consent and data privacy will be key considerations. Users will also want to ensure AI is free of bias and discrimination, and that its use is ethical. Assess with internal stakeholders (business managers, compliance managers, data scientists) the current maturity level in applying ethics and potential opportunities for developing responsible best practices in data and AI lifecycles.

Change management: For most enterprises, the shift in mind-set required for AI can lead to 'cultural anxiety' because it calls for a deep change in behaviour and ways of thinking. It is vital to think about the cross-cutting issues around organisational and employee impact, engagement and communication. Companies should acknowledge the cultural change and be proactive in managing related challenges. This task can be achieved using an effective approach to organisational change management (OCM) via consolidated methodologies (such as PROSCI) based on the best practices deployed in international organisations.

Technology landscape: Evaluate the technological feasibility and choose the solution best suited to requirements. Analyse the vendor landscape to shortlist partners and technology that will underpin the AI solution. Applying the right benchmarking criteria, drivers and principles is a crucial part of the analysis process.

Build the business case: Analyse costs and benefits to drive work forward. In general, business cases will relate to a particular scenario, problem or use case that deploy AI methods and techniques as part of the overall solution. Specific factors need to be addressed on how AI projects differ from other IT solutions:

- AI may not bring immediate ROI because it inherently involves a level of uncertainty and experimentation before it can be deemed successful.

- AI uses heuristic algorithms to arrive at conclusions that might elude traditional rules-based methods, which makes it valuable, but difficult to predict and support with a business case.

- AI requires different technology and skills; talent acquisition is likely to be one of the biggest barriers to adoption. The decision to build, buy or outsource depends on both the project and the company.

Step 2 - Define

Carry out collaborative workshops and discovery sessions to align deliverables with the overarching strategy.

Assess IT and processes: Analyse the landscape, systems and teams that will be impacted by the AI solution. Identify system architecture, catalogue the process, and ascertain the impacts and effort to deliver.

Use cases definition and prioritisation: Define the right use cases based on the value chain and business needs. Set out a detailed roadmap, prioritising the use cases that generate maximum business value - with respect to the overarching strategy and complexity of implementation - in terms of impacts, risks and costs.

Step 3 - Deliver

Proceed to design, develop and deliver the AI applications. Follow a delivery process based on lean and agile methodology, which means the ability to reconfigure operations and support processes in response to evolving needs and competitive threats in the market. An agile approach can be applied at multiple levels, in different contexts and for numerous types of activities. On-the-shelf technologies are very limited and, in most cases, organisations must prepare their own data to use on-the-shelf models, or develop in-house models based on proprietary business data. A reference model is recommended, such as that from the AI Project Value Chain (Source: Observatory Artificial Intelligence Politecnico di Milano), which is based on the following main activities:

Ideation and target definition: Definition of analysis boundaries and conceptual prototyping (PoC, MVP) of the development proposal.

Data source and ingestion: The selection of data sources, as well as the acquisition, cleaning, validation and modelling of data. Selection of the hardware on which to run the model.

Model selection: Selection and customisation of the AI model, according to the objectives, the data available and the project constraints defined in previous phases.

Training and test: The availability of data of sufficient quality and depth constitutes a critical element for the correct approach to this phase in the absence of which it would risk compromising performance.

Deployment and integration: At this stage, the solution must be deployed and integrated with existing systems. Use cases are now ready to be released into a live environment.

Monitoring and continuous improvement: Constant monitoring of model validity, based on the new data that feeds it, could reveal implications not considered in the initial phase.

Step 4 - Operate and monitor

An AI project does not end with implementation. After the development and release of a use case, organisations must determine how to scale:

- Defining future releases for each use case beyond the MVP will allow organisations to scale vertically
- Each use case will have an associated MVP that will enable the addition of more use cases
- Work with the product owner to determine the most viable route for the business

Key takeaways

- An **effective AI- strategy** defines a **structured approach** that not only helps **to maximise the value** of an AI project, but forms the prerequisite for its success.

- Once the solution that best solves the **company's needs** has been defined, the choice of skills and methodologies is made based on the application and functional constraints.

- The **biggest barrier** to digital innovation is not technology or data, but **skill shortages** at **different levels**. Companies must be proficient enough at understanding the AI technology to guide change management and integrate its paradigms in business processes.

- The **core pillars of an AI strategy** are: the design and prioritisation of selected business use cases to align deliverables to the overarching strategy; the definition of the solution delivery process based on agile methodologies; organising the post release of a use case; and the implementation of an operate and monitor approach to determine how to scale.

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