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A new frontier in AI will enable competitive advantage

A perspective on how artificial intelligence can reduce costs and elevate the customer experience across the financial services sector.

Artificial Intelligence (AI) is polarizing. Elon Musk has called it "our greatest existential threat," and said that it is "potentially more devastating than nukes".

At the same time, renowned artificial intelligence expert and Google/DeepMind Director of Engineering Ray Kurzweil has said, "In my view, biological humans will not be outpaced by the AIs because they will enhance themselves with AI. It will not be us versus the machines ... but rather, we will enhance our own capacity by merging with our intelligent creations."

On one side we have Armageddon. On the other, a Utopian vision of harmonious marriage. The messy reality is that the debate won't be settled for many years, if ever. What we do know, however, is that the age of AI is now upon us.

As we'll explore in more detail here, the changes now underway across almost every industry represent tectonic shifts that will play a key role in determining who wins and who loses in the coming decades. And, the impact on the financial services industry is certain to be just as profound.

AI in banking has bottom-line financial potential.

Since the mid-2000s, the entire spectrum of financial institutions – retail and wholesale banks, asset and wealth management firms, investment banks and clearing houses – have been under tremendous pressure to restructure to drive operational efficiencies and growth. The main drivers for this include the following:

- **Regulations** – A global European bank recently cited 80+ new regulations on their radar for implementation. Regulations are here to stay, across major markets globally, so every financial institution will have to continue to adapt.

- **Revenue and Cost Pressure** – Due to the low interest rate environment, margin erosion continues to impact the financial health of the industry at large. On top is the constant challenge to win new customers and markets, which makes achieving top-line growth an even bigger pressure point.

- **Customer Experience –** The ever-increasing expectations from customers, especially millennials, that rely almost exclusively on mobile channels versus traditional branch offices, has completely flipped business models upside down. Customers today, of all generations, have vastly different expectations in mind.

- **New Competitors** – The increasing competition from other banks and non-banks, such as fintechs, is creating an entirely new landscape for traditional players. Market-share is constantly being challenged, and this will only heighten in the years ahead.

- **New Technologies** – The introduction of new automation capabilities and digitally-advanced solutions is pushing banks to consider new business models.

AI Creating Opportunity Across the Enterprise

Source: Infosys Consulting

What is artificial intelligence?

AI as defined by our experts is an area of computer science that emphasizes the creation of intelligent machines that work and react like humans. Some of the activities that AI technologies are designed for include image and speech recognition, learning, planning and problem-solving.

AI is not a one-to-one replacement for people. It's not an all-powerful product capable of the same cognitive thought as we are. Instead, AI realistically consists of technology and autonomous or semi-autonomous machines that take on tasks or jobs that we either don't want to do, or are unable to do. In short, AI is the science of making machines do those things that would be considered intelligent if they were done by people.

AI is already widespread and used by many consumers unconsciously almost every day. Some striking examples include:

Google RankBrain as part of the ranking algorithm within Google's overall search engine, plus Google Translate function, are examples of how we use AI in everyday life to do basic tasks online.

Apple's Siri is an intelligent digital personal assistant which uses machine-learning technology that predicts and understands our natural-language questions and requests.

Netflix uses predictive analytics to accurately recommend (and predict) what a user is most likely to watch next (and it works to almost perfection).

Salesforce Einstein uses natural language processing to analyze text from e-mails exchanged with customers to estimate the likelihood that a user will buy.

Amazon's Alexa has become the smart home's hub by deciphering speech to scour the web for information, shop, schedule appointments, set alarms and a million other things.

The examples of new digital technologies engulfing our everyday lives are endless. Though we as consumers may just perceive it as simply "technology" or "product innovation", smart use of AI is changing the world we live in.

How AI is shifting customer expectations.

The personalization of services is also happening with highly sophisticated customer interactions across the financial services space.

Complicating matters, however, is that private individuals want a customized, human interaction that matches sophisticated analysis with their unique financial goals. Historically, this has been too expensive to scale and has been reserved for the ultra-wealthy, leaving the investing masses with a disparate set of generic, complex tools.

For example, WealthArc, a start-up which raised an additional $1.2m in venture funding last year, is capitalizing on this customer pain point by "leveraging data analytics and artificial intelligence support systems to empower wealth managers to transform the way they share relevant and understandable information with clients."

Essentially, they are using AI to take a service – in this case heavily customized financial recommendations – that has historically been reserved for the 1-percenters and extend it to all investors in a cost-effective way, creating a game-changing offering that can't be matched without the power of algorithms.

We will keep this 'customer experience' principle in mind as we continue to explore these concepts in more detail.

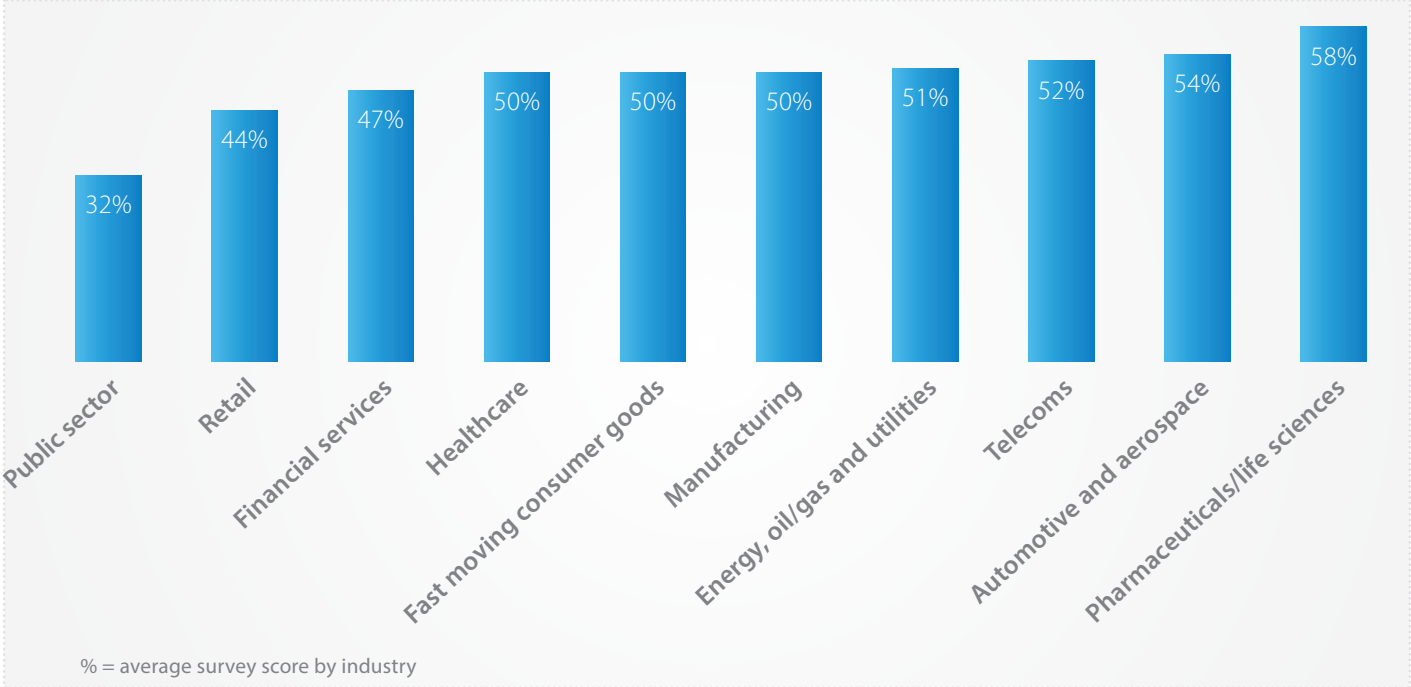
An industry low on maturity, but ripe for adoption

AI in banking is still in its infancy, as confirmed by the maturity index we developed recently. Our research sought to better understand in more detail where each industry currently ranks, and some of the drivers behind this. A few key take-aways from our research showed that:

- The pharmaceutical industry is a clear leader in AI adoption (e.g., in research for new molecules as active substance in medication)
- Automotive/aerospace and telecommunications enterprises also rate very high (e.g., factory production and robotics-driven assembly lines with recent breakthroughs in image recognition)
- Financial services companies currently rank on the low end of AI maturity – we assume this is in part a result of highly-complex, fragmented and costly IT infrastructures
- Financial services is ahead of only two industries, of which one is the public sector

Though the banking and finance sector is clearly a laggard by today's standards, the encouraging news is that clear competitive advantage and market leadership can be won. As a fast-moving firm can clearly set a new benchmark for the industry – and reap the financial benefits that could come with it!

AI Maturity Levels by Industry



Source: Infosys AI maturity index

Amplifying the potential of your workforce through automation.

Financial services companies are under constant pressure to save money, drive growth and optimize their use of its workforce. The possibilities that automation present enable a firm to operate smarter, more efficiently, and with their people doing more of the higher-value work – thus smart use of new technology can amplify the potential of workers across an enterprise.

A number of planning activities in financial services focus on core cost optimization programs. Beyond the basic principles of streamlining operations, today's operationally efficient firms can impact these areas through intelligent automation, or some element of AI, to solve real challenges and opportunities. With this, firms can ultimately free up their people to be more productive and valuable – which is the true essence of how market-leading organizations achieve and maintain competitive advantage.

Some examples of this in practice are:

Predict customer needs – New technologies can significantly improve and streamline the customer experience and the engagement of consumers with your brand. For example, through analysis of historical customer behavior using machine learning algorithms, prediction of customer requirements can become automated and highly targeted, leading to "next best actions" through AI-based recommendation engines.

Reduce regulatory costs – Anticipation and intelligent implementation of new regulations is becoming critical. AI technology allows for the implementation of new policies intelligently, with lower cost.

Proactive, automated case resolution – Smart technologies can reduce costs through intelligent automation in the back offices or in IT operations (e.g., ticket/case volume can be reduced through predictive modeling and pro-active resolution). In a different example, using policy chatbots allow bank employees to ask queries and get answers in natural language, rather than searching endlessly for answers in a collection of disparate documents.

It's clear to us, that in all of these examples, a combination of people and technology must live together to make an organization stronger. The underlying automation of areas like these clearly adds value to the expertise skilled people already provide. AI here "amplifies the potential" of a firm's workforce – and this is where we see the biggest opportunities for the smartest organizations to drive future competitive advantage.

Value Generation Opportunities Through Smart Automation

Research and Compliance	Advice	Risk Analysis	Trading	IT & Operations
• Financial research reports generation, document indexing, sentiment analysis • Cognitive regulatory and policy compliance analysis and support	• Finance robo advisors direct to retail customers or in support of financial advisors	• Fraud analysis, insider trading identification • Financial risk assessment, underwriting analysis	• Trade settlement processing • Knowledge assisted order capture and validation • Algorithmic based trading, high frequency trading	• Applications and infrastructure operations automation • Back-office operations automation

Source: Infosys Consulting

Solving real problems with artificial intelligence

So, now that we've made the case for how people and technology need to live together to create a better workplace, let's explore several key areas in more detail where real business challenges and opportunities can be solved with smart use of artificial intelligence.

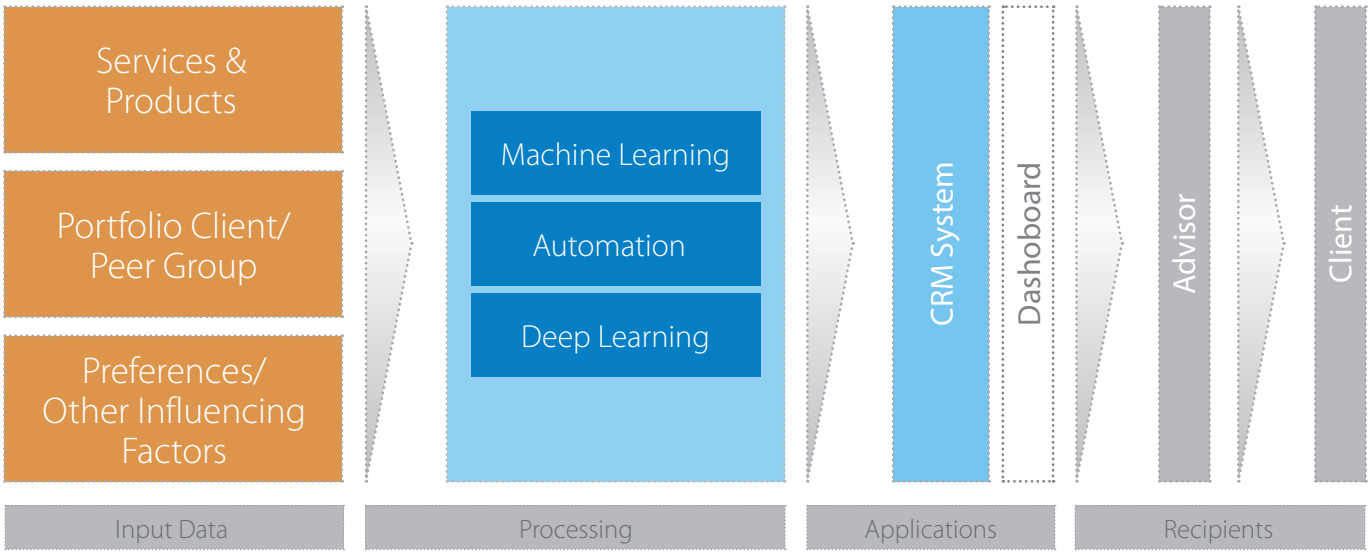
Enhancing the relationship management process with recommendation engines

Similar to the concepts we see every day in consumer platforms like Amazon, banks can make strong use of these principles to harvest deep insights on customers. Whether it's using historical data (ie. purchase history), search themes or analyzing common complaints, questions, and answers, leveraging big data and micro analytics can be a powerful tool to drive relationship management.

Recommendation engines have become the back-bone of any e-commerce platform today, and are easily translatable into the customer experience of a bank's client. The figure below offers a simple, high-level view of how this model could interact together.

In this case, intelligent use of automation means leveraging big data on a client in combination with data from similar clients and their past behavior – and providing this in a customized, easy-to-use way to an advisor – or via an online experience. Personalization is key, and if smartly implemented, it can drive significant revenue streams in an operationally lean way. The outcome can be displayed as next best action for a relationship manager's customer relationship management (CRM) tool.

Recommendation Engine Flow



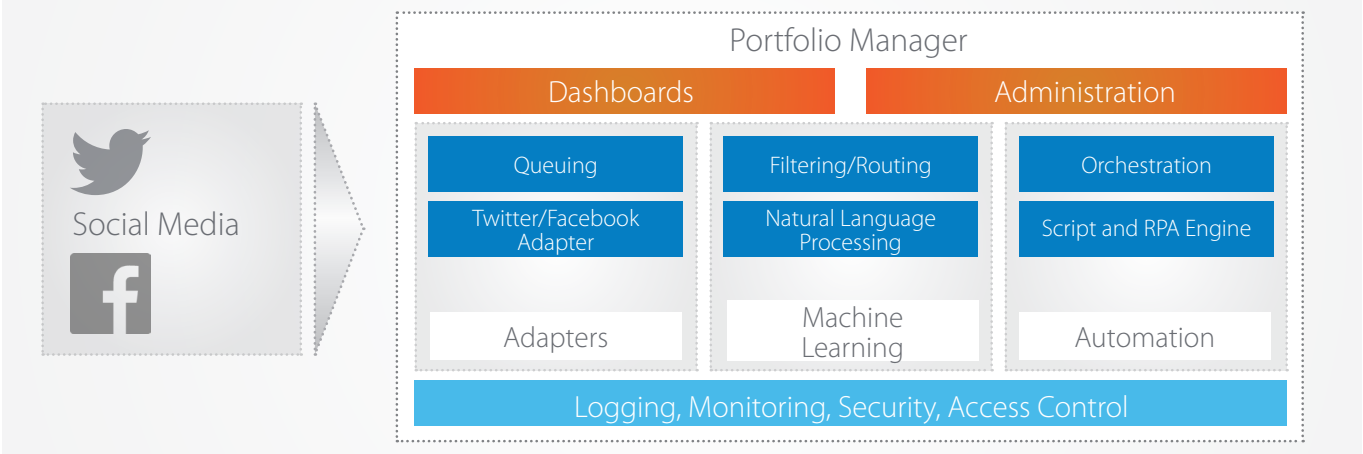
Source: Infosys Consulting

Predict and react before the competition.

Portfolio managers are keen to get early warnings from even very informal sources available, and smart monitoring of social media is often the fastest and most reliable way to have a deep pulse on what's happening in real-time. For example, early warning alerts when news started to break around the Samsung phones catching fire, could have armed portfolio managers with valuable insights on how to potentially manage investments, ahead of the market.

Smart use of AI in this example is first used to digest publicly available news feeds of millions of social media users based on natural language processing (NLP) technology. The platform then determines, based on learned patterns, where to raise an early warning message relevant to current holdings that an institution might have. The power of social media monitoring could equate to vast amounts in financial gains or losses for a portfolio manager when acted on correctly.

Early Warning System Architecture



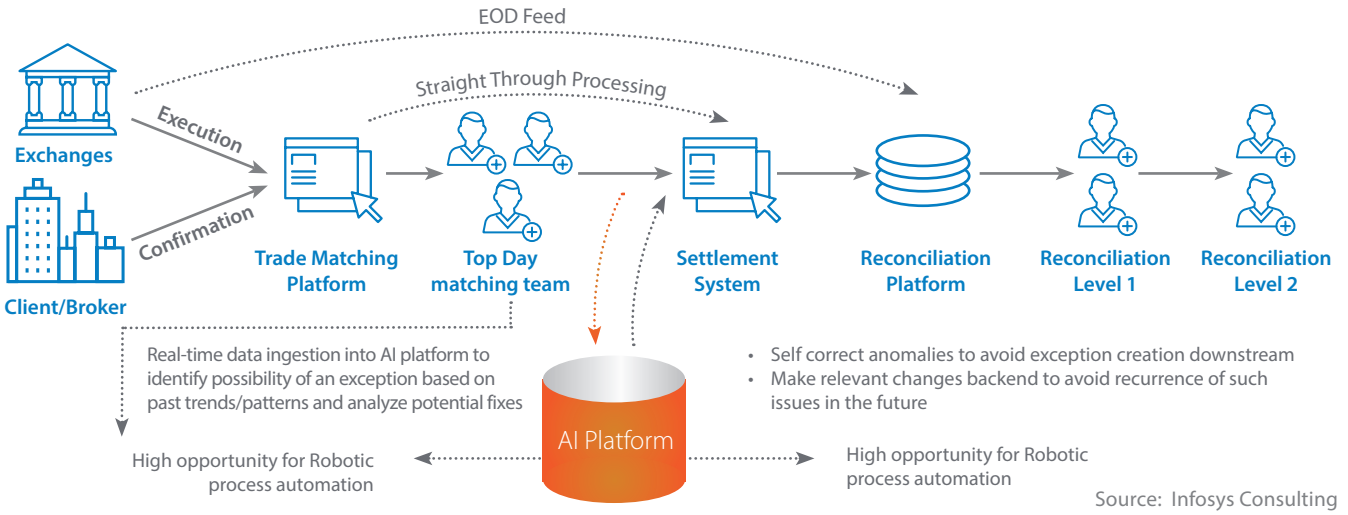
Source: Infosys Consulting

Intelligent automation for derivatives operations

AI technology can also be applied to trade matching and reconciliation in derivatives operations, where time is of essence. For example, trade confirmations need to be matched before end of the trading day to generate settlement instructions as prescribed by the relevant regulatory bodies.

The role of AI in this example is to learn from exceptions caused by the manual steps of a top-day matching team. The matching team is manually matching those trade confirmations, which cannot be mapped automatically by a trade matching platform before the end of a trading day. Fixes to such exceptions can be automated step-by-step from the corresponding robots, and can be sustained by an AI platform through pattern matching. To be able to learn these patterns, the platform continuously observes the reconciliation breaks handled by the top day matching team, plus their manual corrections. This leads to learned patterns of breaks that can be fixed automatically by robotizing the manual actions of the top day trading team.

Automation System for Post-Trade Processing



Source: Infosys Consulting

The journey ahead: start with a strong business case

Embarking on an AI journey can be a daunting task. Organizational bureaucracy, long decision cycles, stakeholder resistance and budget pressures will always remain an obstacle. However, to mitigate some of these factors, we recommend firms to commence with a well-designed business case which is tailored to the specific function(s) in focus. For example:

- **Front Office** – Sales related business cases in this area are typically based on recommendation engines leading to revenue growth through increased customer satisfaction.
- **Middle Office** – Business cases are mainly built around risk topics, therefore cost reduction focused and based on pattern recognition algorithms to detect anomalies before risk materializes.
- **Back Office** – Here it's all about process optimization, and therefore also cost reduction focused (e.g., based on prediction of future needs and proactive remediation).
- **IT Operations** – Business cases in the IT operations area are similar to back office use cases

How to translate planning into practice.

Many organizations are currently experimenting with AI implementations within their innovation teams. However, this means programs often remain far from the mainstream implementation teams where real scale can be achieved. For an approach that can offer more measurable upside and return, we recommend the following:

1. Conduct a top-down exercise – This is a key step to determine the right roadmap based on prioritization of use cases and opportunities. This is often a valuable exercise because business cases for each implementation vary widely, even for the same use case across different banks, due to the different nature of data management. Most importantly, this also allows you to deeply align AI technology usage with the overall business strategy.

2. Data is your currency – The success of almost any implementation depends heavily on the availability and structure of data in high volumes. Lack of volume can lead to challenges in training AI systems. Effectiveness increases with share of structured data across its inputs, but one of the strengths of AI is the ability to integrate also unstructured data (e.g., from voice channels, documents, emails, etc.) by extraction of structured data from it.

3. Quality assurance – At a macro level, three data sets need to be identified for any successful AI implementation: a PoC input data set, the main training data set and one (or several) validation data set(s). Without going into too much detail, there are pre-requisites/constraints that need to be respected (e.g., the PoC data set needs to be a production data subset and the validation data sets must not be contained in the training data set). We cite this to provide an example of subtle differences to traditional implementation (and QA) methodologies.

4. Proof-of-value exercise – Independently from top-down (strategic) or bottom-up (random sample use case) approach, run a proof-of-value exercise (e.g., a proof-of-concept with a sub set of real production data to validate and refine the high-level business case). This helps manage the uncertainty around the business case in terms of the technologies' effectiveness, as outlined above.

5. Roadmap – Based on the refined business cases for a set of use cases, a roadmap and master plan for implementation across the enterprise can be created. We recommend to take other factors into account when prioritizing use cases for the roadmap. For example, the urgency or the increase in customer/employee experience that is desired. The latter is also a key success factor, as one of the main challenges in AI implementation is employee resistance.

Begin your journey.

Solving key business challenges and opportunities leveraging the power of AI can achieve much more than cost savings and operational efficiencies. It has the strength to impact every facet of the customer experience, which is in the end an over-arching goal almost every business is looking to achieve.

In addition, if the conversations are focused around how to better optimize and use the talent of your workforce – or how an organization can amplify the potential of their people through smart use of automation – an organization can plan and implement value-driving programs with the full support of their employees. Without this, technology alone will likely solve very little.

We, as industry experts, lead every day front-line conversations with banks and financial services executives around critical transformation topics. Our conclusion from these intensive dialogues is that the interest of the financial services community in AI is huge, and the technology is believed to have a massive impact to radically change how institutions operate in the future.

About the authors

Claus Hintermeier
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Dr. Claus Hintermeier is an Infosys Consulting partner with responsibility for the firm's financial services practice in Switzerland, and its artificial intelligence offerings across Europe. In his 20+ years of consulting experience, his primary focus has been on applying intelligent technology solutions to help clients to become more operationally efficient and profitable. Claus' interest in the domain started with his first encounter of neural networks nearly 30 years ago – the collection of use cases for deep neural networks from front-to-back across financial institutions. His perspectives are featured regularly as a speaker at key industry conferences, and in the media across leading publications. Claus is a German national and currently resides in Zurich, Switzerland.

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Markus brings 20 years of senior experience and program work to Infosys Consulting, with deep financial services industry knowledge. His consulting background has focused mainly on transformation work, process improvement, and package evaluation and implementation for some of the largest institutions in the space. He is an experienced team leader, having been with the firm for 7+ years, and speaks five languages.

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Senior Principal

Dennis is an experienced consultant leading the C-Suite advisory practice for Infosys Consulting in Switzerland. His focus is on helping clients realize business value from new digital technologies and capabilities, like AI and automation. Dennis has over 15 years of experience in consulting, having spent significant time advising top financial clients across Europe, Australia and Asia.

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Tamazi brings nearly 10 years of transformation work in the banking and insurance sectors to Infosys Consulting. He applies his deep knowledge of industry products and processes from data management and BI projects to develop a vision of AI implementation across functional areas of financial institutions.

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Business Analyst

Nina started with Infosys Consulting as a business analyst in the banking practice, after joining from another leading firm in Frankfurt, Germany. With her passion for digitally-infused technologies to improve work collaboration and process efficiency, she's now a key member of the disruptive technologies practice, applying her skills and experiences in the artificial intelligence and design thinking space. Her current program is giving her a focus on human-centric capabilities, injected with AI and chat bot technologies, across the life sciences sector.

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