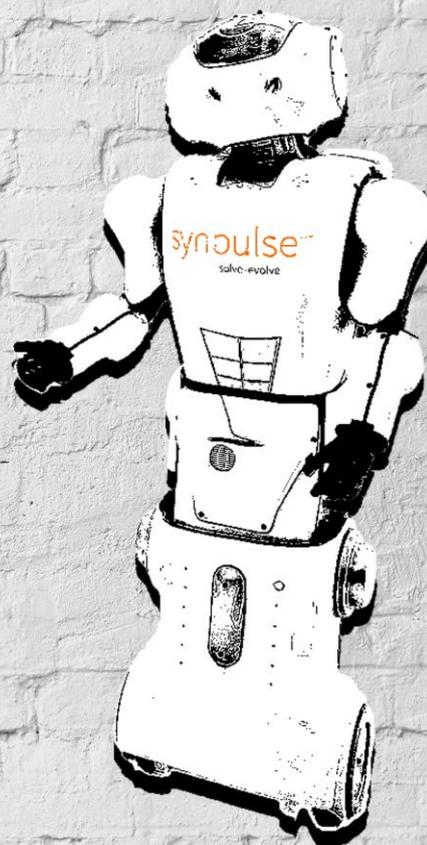# synpulse MC
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Welcome to the Brave New World!

AI and Robotics in Wealth Management

Welcome to the Brave New World

Artificial Intelligence and Robotics for Wealth Management

Humans have always dreamt of replicating themselves, «playing God» through millennia of history. Whether they wanted to create an obedient worker to perform physical tasks, or a man-made «mind» that can reason and even feel like a human, it was always on the agenda. Limited less by imagination and more by available knowledge and technology, historic bids had varying scope and varying success. From ancient Greek mythology, through Leonardo Da Vinci's 15th century «mechanical knight», to Karel Čapek's R.U.R. (the first recorded use of the term «robot») in the 1920's, creating «artificial life» in the form of *automata* has been an integral part of civilisation and progress.

Rapid advancements in science and technology made the 20th century the age of widespread automation, and ubiquitous digital technologies in our 21st century are taking this further to levels our ancestors could not even dream about. Manufacturing industries were the first to benefit from wide adoption of automatization, but many service sectors have followed suit and today *financial services* are among those most profoundly considering, and already adopting the latest automation technologies.

The last few years are seeing extreme growth (some say - a bubble) in the applications of Artificial Intelligence (AI) and Robotics in financial services, and media coverage has turned these terms into popular buzzwords heard every day in news headlines, industry conferences, and banks' strategic declarations. To sift through the hype and provide practical guidance, this paper aims to clarify the meaning of the terms, the variations and overlaps or touchpoints between the technologies, the trends (with particular financial focus), and some possibilities for those committed to staying ahead in the game.

AI and Robotics: what are they, where do they come from, and why now?

Originally evolved as two distinct disciplines and branches of technology, AI and Robotics are now coming closer, often overlapping and easily mistaken for one or the other. To understand the current convergence, we need to look at the origins and «pure» definitions:

Artificial Intelligence is a man-made entity (device or system) capable of performing goal-oriented tasks in ways similar to humans: perceive the environment, interpret it and make decisions leading to higher chances of attaining the goals. It emerged as a scientific discipline in the 1950's and is mostly concerned with modelling the human thought process in problem solving and decision-making. Since then it has evolved in waves of great enthusiasm (and investment) divided by a period of disappointment and reduced activity (known as «AI winter»). We are currently in a wave of great empowerment by computing progress, driving business interest in both adoption of available solutions, and investment in new developments.

> AI evolves in distinct waves of great enthusiasm and investment, followed by disappointments and «AI winters». The current wave comes at a time when technology advancements and massive data accumulation are providing the right conditions to reap the AI benefits.

The Robotics industry, on the other hand, has a longer history - starting with pragmatic industrial applications: programmable production machines were widespread decades before AI was born, while in the second half of the 20th century some of those machines literally mimicked physical human actions, e.g. the widespread welding robots in the automotive industry. In the 21st century the robots entered the service industries, while simultaneously moving from the physical domain to the virtual/digital, where most of the processes occur in sectors like telecoms, public services and, of course - banking and insurance. These «robots» no longer resemble human arms, exist in the IT systems as software and automate the processes that still require human

interaction between and around those systems. Thus the branch discipline of RPA (robotic process automation) was born, by now a mature industry in its own right, with multiple powerful vendors and endless success stories around the globe.

> Today's robots don't have metal bodies and lightbulb eyes. They are invisible chunks of software, quietly and tirelessly doing their job day and night, time after time - always with the same precision and speed that cannot be matched by humans.

While AI brings increasingly accurate object and pattern recognition, «clever» reasoning and decision making that on occasion defeats the human one (as in certain games, famously won by computers against human champions) - and RPA humbly and quietly (but relentlessly) brings efficiency and risk reduction to simple repetitive tasks, they also extend towards each other's territory. AI-based interfaces not only process natural language, they acquire some physical attributes like a human voice (Siri, Alexa) and even an animated face. Back-office robots, on their part, are using cognitive methods, becoming more intelligent and capable of conditional decisioning, not just programmed repetition.

How does AI work and what can it be useful for?

Most of the artificial intelligence being developed is based on the automated cognition and origination of conclusions or decisions. This is not pre-programmed in a fixed way but arrived at through a process known as Machine Learning (ML). Coined as a term by Arthur Samuel in the 1950's, ML originates in early prototypes of ANNs (artificial neural networks) and a success story of the time is a programme that would teach itself to play checkers (draughts) and even defeat many humans at it. Today ML uses a large variety of methods and algorithms, and is considered to fall into three broad types:

◌ Supervised learning - where humans are involved in «training» an algorithm. The humans set a target output and feed data into the model to enable it to relate inputs (e.g. election results) to the preset output (e.g. stock prices). Once sufficient accuracy is achieved, instead of «training» data, the algorithm can be fed new real data and used to make predictions. Techniques used are mostly statistical: regressions (linear and logistic), decision trees, vector machines, and simple neural networks.

◌ Unsupervised learning - no predefined output is provided, and no human intervention involved. The algorithm receives unlabelled data, infers a structure within it, and then identifies groups of data with similar attributes (e.g. clusters of people with similar investment behaviour).

◌ Reinforcement learning - the algorithm learns to perform a task by maximising rewards given for actions that lead to desired outcomes. Each time it gets a step closer to the positive outcome, it is given a reward and optimises a series of actions to maximise the total reward received. In investment management such learning already drives some automated trading strategies.

Another term can be often found in association with AI: Deep Learning (DL). It is a more advanced form of ML, using multi-layered neural networks for internal processing and analysis while interpreting larger volumes of data from broader sources. One major type of multi-layered neural network is the CNN (convoluted neural network), dating form the late 1980's when it was first used to interpret and recognise visual shapes (simple images like alphabet characters and object silhouettes). In the other multi-layered type - RNNs (recurrent neural networks), neurons in the hidden layer form so called «context nodes» for learning data sequences. This model acknowledges dependencies between input variables (while most other ANNs treat them as independent). This ability to interpret sequences is useful in NLP (natural language processing), e.g. letters in a word or words in a sentence.

These machine learning types, behind the bulk of AI applications, can also be combined with adaptive and contextual functionality broadly referred to as *cognitive computing*, and implemented for practical tasks and activities such as:

◌ Marketing and sales analytics: discovery of dependencies and causality relationships between external factors, company actions, and campaign outcomes.

◌ Predictive modelling of customer behaviours: propensity to make certain choices and decisions, likelihood to churn to competitive providers, or to commit fraudulent acts.

◌ Analysis of unstructured data (e.g. text, images and videos from mass and social media) for identification of sales opportunities, or for *KYC* (*know your customer*) searches.

◌ Enable NLP (natural language processing)-based chatbots, to provide near-human CX with the ability to comprehend and interpret user input, and provide meaningful output in the context of the famous

«*Turing test*» (indistinguishable between machine and human interaction).

Robot types and Wealth Management use cases

Robots can vary significantly in their mode of operation, place in the ecosystem/architecture, level of intelligence and main purpose for deployment. Each type is designed to bring a mix of tangible and intangible benefits like efficiency and cost reduction, improved quality, precision and CX, error and risk reduction, etc. Some robot types, however, focus on one benefit area and enabling functionality, at the expense of another. There are no «pure» types, but based on prevailing attributes, the following have emerged:

Front-end (interaction) robotic applications

While providing some efficiency gains (e.g. in mass use cases like retail banking and consumer insurance), their focus is more on improved quality and enhanced user experience (CX). This is where the robotic (humanoid automation) aspect overlaps with- and utilises AI with learning and cognitive functionality.

- One group under this branch are typically known as *chatbots*, but they have evolved well beyond simple chat (short-text, IM-style interactions). Some of them are capable of interpreting longer texts (machine-read letters, emails) and composing meaningful responses. Others interact through speech - like the popular Alexa, Siri or Google Assistant. The life-like Cora, piloted by NatWest Bank, reminiscent of sci-fi characters, is said to even use AI to understand customer emotions and adapt the interaction accordingly. The same fintech vendor (Soul Machines of New Zealand) is behind the latest humanoid bot Sarah, developed for Daimler Financial Services.

- Another human-facing class in financial services recently became notoriously popular as *robo-advisors*. Initially promoted as disruptive challengers to classical wealth management institutions, nowadays there is hardly an incumbent bank or wealth management firm without its own (home-built or acquired) *robo-advisory* proposition. These solutions have their own user interface (of varying quality and user experience), but the focus is less on interaction management and more on automating the support for client investment decisions. Most of the currently running robo-advisors lack the sophistication and scope to cater for HNWI and UHNWI clients but address the needs of the «mass wealth» (the long tail of upper income/mass-affluent consumers, whose sheer numbers underpin a vast

bulk of assets in need of professional management). The thinly spread cost of automated advice takes it even further into lower segments, offering affordable «wealth management» for the less fortunate masses and performing an added social function.

One must understand that the above front-end robotic types are not exclusively meant to deal with customers. They are equally efficient and UX-enhancing in internal deployment for employees, as well as other stakeholders like financial intermediaries or government authority agents.

Back-office (operations) robotics

The emphasis here is on industrial-style automation, performing at speed standardised repetitive actions with predictable (and reliably persistent) outcomes. Established for at least a decade, *robotic process automation* (RPA) finds fertile ground for efficiency gains at the interface touchpoints. The prime candidates for such automation are interactions between a machine and a human (e.g. data entry or validation), or between machines with a human intermediary (in complex architectures with multiple systems).

Originating from an older technique known as *screen scraping* (capturing in electronic form data that has been formatted for visual display to a human user), RPA virtual workers nowadays routinely log into upstream systems with human credentials, capture output data and seamlessly enter it into the downstream target system. Most current RPA platforms and technology solutions are designed for rapid development of bots with minimum programming skills (or none at all), with a visual workflow interface that enables drag-and-drop (re)configuration of process steps and tasks and the deployment of RPA takes weeks, rather than months; with immediate benefits driving strong ROI.

Some instances of RPA deployment in Private Banking and Wealth Management include (but are not limited to):

- *Client onboarding*: often involves a lot of manual data entry, time-consuming prospect creation and account opening (sub)processes, several KYC steps and, according to best-practice research, can potentially be up to 85% automated.
- *Reconciliation of securities*: laborious repetitive activity with significant manual component and use of office productivity tools (Excel) side-by-side with large and complex technology platforms; completed

pilots show up to 50% effort reduction, as well as much lower error rates.

○ *Rate and price uploads*: another highly manual operation involving Excel sheets; whether in-house or BPO-performed, it can be streamlined with RPA for considerable savings and error reduction, leaving humans to only handle exceptions.

○ *Test automation*: in all technology implementations, changes and updates, release deployments or maintenance interventions, testing involves a lot of human effort and consumes a considerable portion of total project time; prime targets are highly repetitive test procedures, which can be automated with RPA and resources (re)allocated to training and other human-dependent activities.

○ *Invoicing*: organisations where large numbers of invoices are regularly generated with input from various systems, involving manual work and critical validations, can benefit form RPA to automate at least half of these activities, reduce error and disputed invoice resolutions, and increase timely payments to over 90%.

○ *Filing of statutory forms and documents*: e.g. tax returns, where wealth managers are providing tax services to clients; this is a repetitive routine task, highly seasonal (with excessive workloads near deadlines), stress of overloads and deadlines increases the probability of human errors; very easy to robotise with compelling savings, improved accuracy and compliance.

While the above (and many similar) processes are simple in nature and early targets to prove the concept, larger and more complex processes demand increased sophistication and some RPA solutions are increasingly involving AI to replicate more complex human actions. In one example, AA (Automation Anywhere, one of the RPA industry global leaders) is offering IQ Bot™, a process automation solution with cognitive capabilities allowing work with unstructured data and/or natural language, decisioning (rules engine) based on discovery and interpretation capability, and integration with advanced AI platforms like IBM Watson™.

AI and Robotics are no longer separate disciplines: now AI drives robo-advisors and interaction bots, while back-office process robots are becoming intelligent and leverage cognitive capabilities to run more complex processes.

Another example of convergence with AI and increasing sophistication is the above mentioned *onboarding* process, originally automated just for efficiency. The *KYC* and *AML* (anti- money laundering) components therein are very demanding on human input or higher machine intelligence. This is where the initial form-filling simple RPA goes through external system access (e.g. the Thomson Reuters World-Check) to obtain information and bring it into the account opening process; from this level, the evolution is into fully-fledged AI solutions that crawl massive sources of unstructured data (dedicated databases, but also mass- and social media in any location and language). The KYC and AML solutions of vendors like IMTF or SmartKYC (and parent Finantix) are successfully doing precisely this, offering their user institutions unparalleled insight into client backgrounds beyond compliance requirements. At the opposite end of niche functionality and short implementation times, Synpulse is currently piloting an AMS (*adverse media screening*) solution based on technology from AI vendor Squirro that brings insight not just for onboarding, but for on-going monitoring of existing clients, also a regulatory requirement.

State of the industry and global trends

It has become customary to write and talk about AI and Robotics as an «industry», a growing ecosystem within the greater Technology universe, and like every industry it has developed its taxonomy of solutions and players, segmentation of target users and automated activities, delivery models and, not least, its economics with investment requirements and return-projecting business cases.

Key players and propositions

The AI and RPA sectors of this industry have evolved differently and represent two rather different pictures: process automation robotics is relatively standardised and consolidated, with a small number of vendors dominating the space. Leading names include the already mentioned AA, along with Blue Prism and Kofax. Rapidly growing UiPath is challenging the top with even simpler, easier to develop and more affordable licensing. Also active in the field are Pegasystems, Datamatics, BlackLine and a number of small start-ups with ambitions for a share of the RPA pie. The total group offers very similar products, deployment approaches and ROI models.

In contrast, the AI space is highly fragmented - not least because the underlying ML algorithms are abstract, essentially academic, and can be implemented within any OS and coding environment, even within any

packaged solution or cloud service. This has led to many other vendors utilising elements of those algorithms in combination with some specialised solution written around domain expertise and/or market demand.

This diverse space contains, at one end, the giants of the technology world like Google, Microsoft, Amazon, IBM. Each of them has a number of diverse offerings, typically including a platform for everyone else to base point solutions on, as well as a number of their own platform-based or unrelated point solutions from predictive forecasting tools to the popular humanoid personal assistants. At the opposite end are niche players with often original ideas, but still meandering in search of their space in the universe of intelligent machines. Those include deep learning specialists like Deep Dream and Inbenta and «conventional» ML firms like Scikit-learn, PrediCX, or BigML. Closer to the Private Wealth sector and to our own ecosystem of technology partners there are the cognitive analytics provider Squirro, wealth-devoted comprehensive provider Finantix, or «augmented intelligence» provider MondoBrain.

Adoption on the client side

The potential for the above-listed solutions spans the entire spectrum of Financial Services, obviously with clearer business cases in large-volume operations like retail banking and mass consumer insurance. Private Wealth also has a lot to benefit, but the novelty of these technologies is somewhat contrary to the sector's historically conservative nature. Innovations are usually adopted reactively, to counter market pressures or meet regulatory requirements. AI and Robotics have a lot to offer, even in these areas:

- ○ RPA allows early adopters to leverage efficiency and compete in a climate of declining fees and margins. This, and the higher maturity of the solution, are possibly the reason for more deployment cases, not only PoC (proof of concept) and pilot projects, but quite a few «business as usual» robotised processes.
- ○ AI can enhance, through human interaction interfaces and assistants, the customer experience and attract new client acquisitions, while also improving the retention of existing clients. Insight into needs, motivations and behaviours can also lead to attracting more assets under management.
- ○ AI can also, as mentioned above, ensure better compliance through intelligent KYC and AML applications, a fast moving area right now.

In our ongoing research we keep hearing about intent, but still few active projects or success stories. An earlier survey (end of 2017) found that over 60% of senior industry leaders expect a «very significant» impact of AI and Robotics, and 30% «significant»:

What will be the impact of AI & Robotics on efficiency over the next 18 months?
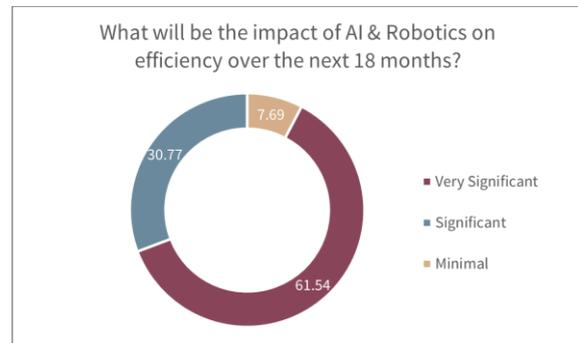
Source: Synpulse UK, Survey December 2017

Yet two-thirds of respondents were still hesitant and «considering» possible adoption, with only 11% having an actual implementation:

Stage of Adopting AI & Robotics among UK Wealth and Asset Managers
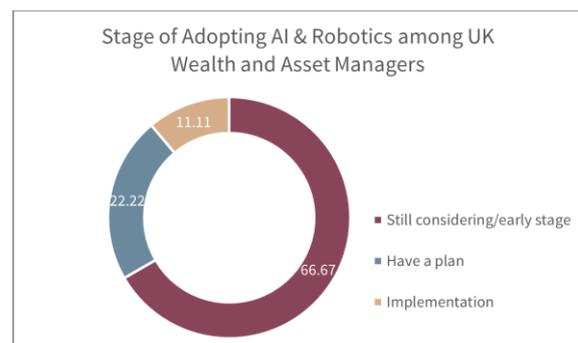
Source: Synpulse UK, Survey December 2017

In subsequent in-depth interviews with a number of C-level executives from the sector, we kept hearing about pressures and challenges that draw resources to more urgent priorities, but might be eased by the right adoption of AI and/or Robotics:

- ○ Continuing regulatory pressures (a perpetual theme, it seems?)
- ○ Vanishing margins due to competition, ubiquity of information and, not least, by the resource demands of regulation
- ○ Rapid consolidation as the last remaining source of growth
- ○ Need to radically improve efficiency to benefit from the (inorganic) scaling
- ○ Increased caution in anticipation of an overdue market correction

In addition to these objective factors, many executives openly admitted insufficient awareness and knowledge in the subject area. From not knowing what solutions are

available and what they can do for their business, to not having sufficient evidence of prior implementations elsewhere - a sense of uncertainty not helped by the perception that all these solutions are prohibitively expensive (not necessarily the case). There is consensus that vendors and their implementation/consulting partners should do more to educate the market, and to build confidence by sharing case studies of completed deployments.

> «We would like to hear about more examples of applying AI and Robotics to immediate practical challenges of the Private Wealth sector. To give us the confidence to try it, we need case studies of successful projects, including real implementation durations and costs. »
>
> *(COO of a prominent WM firm)*

UK Wealth Management opportunities and considerations

Shall we automate the front-office interactions, or the back-office processing? Is AI for our firm, or, rather RPA? The answer is: «Yes! » But not as in «Yes - all of these». More like «Yes - any *one* of these. » As much as a wealth management organisation might potentially benefit from both intelligent front-end automation and from back-end efficiency, as much as the «ideal world» might envisage a large and diverse population of bots working in harmony for the joy and benefit of customers and shareholders alike - the real world is somewhat different. The benefit realisation in any of those cases would depend on focus, timely and effective delivery, and optimal resource allocation towards such objectives. The proverbial «one bite at a time» rings very true in this context and is a proven way to build success with minimum risk and cost.

Let's look at some very realistic scenarios for the broader Wealth and Asset Management industry:

Benefits of AI and RPA in end-to-end operations

The acquisition of new clients in wealth management relies on different lead generation and opportunity management from the mass retail market. With or without a SFA (sales automation) system, here the «R» in CRM is far more important (as in *Referrals* or *Reputation* in addition to strong Relationship). Intelligent targeting can benefit from modern cognitive solutions, AI-driven

analytics of unstructured data, and learning decision-supporting algorithms. Enabling technologies exist, as well as domain expertise; and this can be a start to bringing AI into your operations.

> AI can intelligently assist, and RPA can efficiently automate the entire client life cycle, end-to-end from before acquisition, through onboarding and a long profitable relationship, to handing over the wealth to the next generation.

Once the acquisition/sales process is successful, *onboarding* of the new client becomes a challenge. Not only the growing demands of new regulations, but also the need for efficiency and, not least, for best customer experience (CX) is putting pressure on the onboarding teams. Here multiple applications can add value: managing the end-to-end onboarding process on a single dedicated platform with maximum built-in automation, or automating manual tasks in an existing environment with rapidly deployed and cost-effective RPA can deliver the efficiency and, with the speed achieved, part of the CX improvement.

Within the onboarding process, KYC steps pose their own challenges (and risks). Here a simple RPA robot can contribute efficiency by automated connection to established reference sources (e.g. Thomson-Reuters' World Check or alternatives like KYC360/RiskScreen), «filling» a form, receiving the data and attaching it to the client's documentation. Beyond this, AI-based solutions capture input from multiple sources (including unstructured data), subject it to cognitive analysis and provide more comprehensive and informative client background. Some of those are geared to satisfy compliance needs, and others extend into ongoing monitoring through the entire client lifecycle for any potentially adverse information and risk prevention.

During the lifecycle, growing the managed assets (share of wealth) through targeted cross-sell offerings can also benefit from better insight of needs - beyond those declared in conversations and filled forms. Modern behavioural psychology, combined with deep learning tools can prompt to an advisor a relevant offering with much higher chance to appeal to the client and to be accepted for mutual benefit. Similarly, the outflow of assets (not to mention the churn of clients) to competing institutions can be detected much earlier with intelligent

algorithms and prevented through other AI-based decisions and actions.

While all these client-facing activities take place, the back office keeps processing volumes of transactions, regulatory filings, report production and many other activities. Enabled by a variety of systems, those operations often require manual data entry or transfer across systems and their respective interfaces: identifying such tasks and assigning them to RPA is one of the fastest paths to measurable results from the use of robotics.

A few guidelines and tips

In our Digitalisation Strategy paper and 2017 event, we came up with the concept of *focused initiatives*, an alternative approach to «big bang» transformation programmes. This is even more compelling with the adoption of AI and Robotics in your business. The keyword is «focus», highlighting the importance of rigorous prioritisation and commitment to a chosen use case and solution, to ensure its successful implementation and rapid benefits realisation.

Among the various examples provided above, some may appeal to your company more than others; or you may have needs that were not mentioned; yet you believe they will benefit from automation. It is important to take inventory of all known use cases, agree comparative criteria for prioritisation, and shortlist most likely ones that would merit a pilot project. A pilot (or proof-of-concept) project is never undertaken out of curiosity or for mere experimentation: it *must* have a clear business case with tangible benefits, albeit small (commensurate with the short timeframe and low cost). The benefits to consider in comparative prioritisation should not be limited to monetary (e.g. cost savings), but also account for qualitative values like accuracy, risk reduction or CX improvement.

> Start small, with a focused initiative towards a simple and clear goal. Keep in mind, though, that this is the start of a journey and envisage the bigger picture and longer-term direction for ultimate success.

Last, but not least - the chosen PoC project should not be seen in isolation, as a one-off effort. Better practices consider the potential for extension, leveraging the learning and initial investment for building further capabilities and meeting new objectives with increasing

returns. By envisaging the possible continuation in the same direction, you are embarking on a journey - a way to reach much higher goals; possibly the outcomes of a «big bang» transformation, but without the strong change resistance, prohibitive budgets and failure risks. We strongly encourage selecting a small and viable project with the future bigger picture in mind.

* * *

The global Wealth Management industry is experiencing radical changes; the UK market, as one of the largest and most vibrant, has its own challenges in the years ahead. At the same time, AI and Robotics, a most exciting innovation area, is maturing and rapidly entering the Private Wealth space to solve problems and bring new opportunities. The rhetoric question «Nirvana or apocalypse?» at the 4th Senior Executives Forum has no clear answer. It has the potential to be each of these, and it is up to us what future we want to build. Those with courage to experiment and ambitions to lead have the best chances to experience an AI and Robotics -enabled nirvana, as they win over competition and create value for clients and shareholders alike.

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