



How Barclays is Predicting the Future

A Partnership with Simudyne



Insights: how Barclays is predicting the future

Barclays' Group Chief Risk Officer, C.S. Venkatakrisnan, on the bank's partnership with simulation company Simudyne—and how Barclays' early adoption of agent-based modelling and artificial intelligence is helping create a “more robust and stable bank” for customers and clients.

Whether you're increasing robustness in your business or seeking growth from it, using different methods to prepare for a 'what if' scenario is critical to businesses. With the rapid advancement of artificial intelligence (AI) and machine learning transforming the world of predictive models, real time simulation has become a reality.

That's why Barclays is partnering with the innovative London-based simulation company Simudyne, whose agent based modelling (ABM) and artificial intelligence technology allow the rapid development of computer simulations that can scale massively using modern Cloud infrastructure. The partnership is improving our ability to analyse complex, non-linear risks faster and cheaper.

As part of our commitment to computational finance, ABM and our drive to help new fintechs evolve, we recently led a US \$6m Series A funding round for Simudyne that allows their solution to scale and develop more accurate and diverse simulation capabilities for the financial services industry.

Simulations today, and why they need to improve

Simulation drives decision-making within banks. However, banks vary in their capacity to model reality, which has a direct impact on the quality of their decisions. In part, this variation is the result of having different client types, being in different markets and providing different products and services, but it's also due to the fundamental, underlying approach used to build simulations.

Risk simulations, for example, are complex. One reason for this is that traditional 'top-down' models often don't capture the subtleties of the many entities and their interactions that are involved in the risk system.

They can correlate variables in historical data but they can't always identify



causal relationships in it, making it difficult to extrapolate and predict a potential future outcome.

In many cases, ABM is a more effective alternative to those top-down models—the real world ‘agents’ are modelled from the bottom up, as individual entities within a wider system. They’re then combined with decision-making heuristics or adaptive processes to predict complex phenomena and answer ‘what-if’ questions.

How Simudyne breaks new ground

The technology associated with ABM is now more sophisticated. Supercomputers are no longer required and decisions based on simulations can be made in real time. Simudyne’s platform simplifies the design and operation of models by leveraging the power of distributed compute in the Cloud. This allows them to be deployed and scaled on-demand, radically reducing operational costs.

Using ABM, banks can enhance the realism of their simulations to account for feedback loops, unusual relationships between agents and complex scenarios that include external factors such as climate impact. And speed is no longer limiting. Distributed compute power and scalability now allow simulations to drive decisions in realistic time frames—within seconds if necessary.

In addition, artificial intelligence models can be trained using computer-generated data from an ABM system so that realistic data sets – normally hard to come by in complex systems—can be synthesised and used in simulations.

At Barclays, the technology has several use cases, in the areas of credit risk, market risk and operational risk to model ‘default contagion’, where a shock occurs to a system and market changes or disturbances spread between institutions or across geographies. In the future, we will look to apply the technology to stress testing, which assesses whether banks have enough capital to withstand extreme shocks (such as rapid jumps in unemployment rates) and whether they’re able to continue to support the economy in such severe conditions.

We see Simudyne’s platform as a powerful way to supplement our existing toolkit of scenario-planning models across the organisation’s multiple businesses and geographies. We are delighted to be using Simudyne’s toolkit as part of our ongoing efforts to improve the ways in which Barclays identifies and manages risk. By building agent-based models we hope to spot and prepare for risks



arising from dynamic and large, direct and contingent, counter-party exposures —helping create a more robust and stable bank for our customers, clients and shareholders.

Simudyne on the Barclays partnership

Barclays was one of the early adopters of ABM in the financial services industry. The bank first began working with Simudyne when the company joined the 2017 London class of the Barclays Accelerator, powered by Techstars.

Justin Lyon, CEO and Founder of Simudyne, has likened its technology to the board game ‘Go’. “We built a simulation of the game and had the AI play it millions of times over. Through this repeated self-play, it learned strategies it could then deploy in the real world against human players. Similarly, our software helps banks make radically better decisions in the financial markets—whether that’s improving artificial or human intelligence.”

He added: "Agent-based modelling has opened up a number of opportunities for banks to test any decision before committing resources or taking any action in the physical world. Barclays’ decision to use simulation as a competitive advantage is just one expression of their focus on innovation. We are also pleased to be collaborating with the bank on the Barclays’ computational simulation Centre of Excellence—an initiative to explore the fundamentals of risk management technology—to help surface the ideas that will underpin future profitability and waste cutting.”

ABM originated in the natural sciences, but it’s taken a decade of research for ABM to mature. ABM models range from the very simple to the very complex depending on the level of realism required. Until now, to run complex models massive computer power was needed. For some commercially useful scenarios, this meant employing highly parallel arrays of supercomputers like that in HLRS, a high performance computing centre in Stuttgart, Germany.

This case study originally appeared [on the Barclays website](#) on 8th July 2019.



Contact

A: St Michael's Alley, London, EC3V 9DS

E: info@simudyne.com

W: simudyne.com

TW: twitter.com/simudyne

LI: [linkedin.com/company/simudyne](https://www.linkedin.com/company/simudyne)

Simudyne is a simulation technology company based in the City of London. It uses advanced analytics and applied AI alongside agent-based modeling and simulation to help organizations solve complex problems and make better decisions. With Simudyne, you will be better able to attract clients, investors and assets while reducing and often eliminating costs.