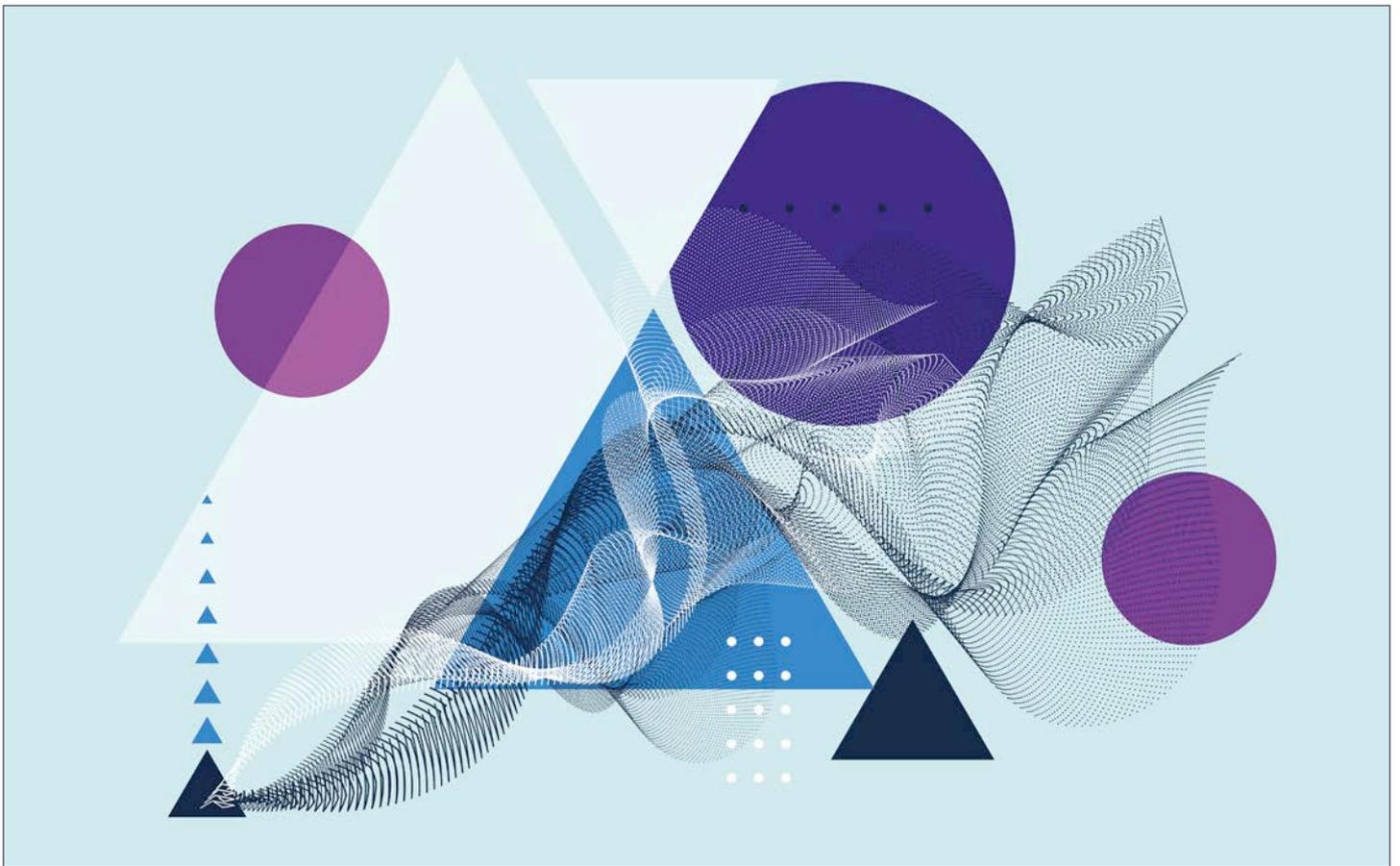


Digital banks Harnessing technology to deliver growth

Risk.net January 2023

White paper



As digital banks face their toughest times yet, their choice of technology for credit risk analytics and identifying growth opportunities could be pivotal to success

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About Moody's Analytics

Moody's Analytics provides software and solutions that deliver data, intelligence and expertise that builds up banks' confidence, empowering you to make pivotal decisions, and take decisive action to turn your bank's plans, into a reality.

To grow with confidence, you need a solid foundation of risk and compliance management, as well as tools and processes geared up to spot opportunities and act on your ambition.

Our expertise, packaged in software, services, data and analytics will help digital banks stay focused on their growth, while we help take care of risk, finance and lending processes.

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Introduction

In their relatively short lifespans, digital banks have encountered some massive disruptions. Brexit, the Covid-19 pandemic, the Russia/Ukraine crisis and soaring inflation have all brought their own challenges to online-only banks. So far, though, digital bank casualties have been fairly rare, and the number of digital banks worldwide is now around 250 – a 150% increase from 2017.¹

However, the sector now faces possibly its most testing time yet, as interest rates rise worldwide, a cost-of-living crisis grips the UK, and an energy crunch and economic downturn sweep across Europe. While large banks tend to benefit from higher interest rates, as they enable them to increase their net interest margin, medium-sized and digital banks – which tend to rely more on savings deposits than loans – will find it more difficult to widen their margins. Additionally, venture capital funding is slowing in the current economic climate. The downturn will also trigger increased defaults, which could be skewed to smaller and medium-sized businesses, again impacting digital banks harder than traditional ones. As a result, consolidation and further failures in the digital banking sector are expected.

“The current economic uncertainty is obviously a key challenge for us ... We’ve certainly been tested with Brexit and Covid-19, but we have never been tested in a recession or a downturn



Valentina Kristensen, OakNorth Bank

obviously a key challenge for us,” she says. “We’ve certainly been tested with Brexit and Covid-19, but we have never been tested in a recession or a downturn.”

To thrive in these conditions, digital banks need to identify and act speedily on opportunities that will grow the business while managing increased credit risk and navigating a complex regulatory landscape, as well as continuously improving the customer experience.

Digital banks’ use of technology to manage these priorities will be pivotal to their success. This includes having an underlying platform that achieves speed, high levels of automation and an ability to scale, as well as harnessing specialist technologies that can be used to identify growth opportunities and assess and mitigate risk.

“With substantial inflationary pressure, rising interest rates and decreasing trading valuations, businesses are faced with the need to adapt their business strategies and outlooks to weather the tough economic times ahead



Alexander Weber, N26

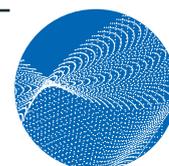
“With substantial inflationary pressure, rising interest rates and decreasing trading valuations, businesses are faced with the need to adapt their business strategies and outlooks to weather the tough economic times ahead,” says Alexander Weber, chief growth officer at German neobank N26. “This presents unique challenges for all banks and tech companies alike.”

Valentina Kristensen, director of growth and communications at UK-based OakNorth Bank, agrees: “The current economic uncertainty is

obviously a key challenge for us,” she says. “We’ve certainly been tested with Brexit and Covid-19, but we have never been tested in a recession or a downturn.”

150% increase

in digital banks to around 250 worldwide since 2017



Notes

¹ Moody's Analytics (February 2022), Rapid growth of virtual banks puts new verve into old banking systems, <https://bit.ly/3uxiNZXc>

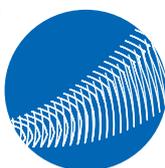
Growth goals

Until recently, profitability was not a major priority at many digital banks. Cheap and plentiful venture capital funding allowed digital banks to prioritise growth in new geographies and products over profitability. However, as funding becomes more expensive – or is withdrawn altogether – profitability has become a bigger priority.

“Profitability is one of our key priorities over the next five years,” says Weber of N26, which has garnered 7 million customers since its 2013 launch and was valued at \$9 billion in 2021. “As global funding in the tech space continues to slow, our focus too is adjusting. We are recalibrating our strategy towards profitability, and then being in a position to best assess the market environment in the future.”

22% growth

in Atom Bank’s business and residential loan book this financial year



of consolidation,” says Weber. “We see this as an opportunity to increase market share, especially as we anticipate the adoption of digital banking to continue to accelerate.”

UK-based Atom Bank aims to become the fastest-growing lender in the UK, according to its chief risk officer (CRO) Rebecca Cartwright. Founded in 2014, Atom Bank was the UK’s first digital-only bank to be granted a regulatory licence. Its business and residential loan book grew by 22% over this financial year, reaching £3.3 billion (\$3.8 billion). Atom achieved its first monthly operating profit in the first quarter of this financial year, followed by three further consecutive quarters of operating profit up to March 31, 2022.

Meanwhile, TymeBank, which has 5 million retail clients and 100,000 business customers, has ambitious plans to add upwards of one million customers per year, a strategy that owes much to cloud-based technology. “Being hosted in the cloud means we don’t have any limitations, so we can scale at a rapid pace while maintaining high levels of customer service,” says Bruce Paveley, TymeBank’s chief technology officer (CTO).

“Being hosted in the cloud means we don’t have any limitations so we can scale at a rapid pace while maintaining high levels of customer service

Bruce Paveley, TymeBank



Having withdrawn from the UK in April 2020 and from the US in November 2021, N26 is now focusing on Europe – in particular Germany, France, Italy, Spain and its expansion into eastern Europe.

“We expect to see further shifts in market share as global venture capital funding in the tech space continues to slow, which will likely include a wave

“Profitability is one of our key priorities over the next five years

Alexander Weber, N26



Key priorities

As well as targeting growth, another major priority for digital banks is speedy credit decisioning to onboard customers quickly and efficiently. This distinguishes digital banks from traditional banks, where the process is notoriously time-consuming.

“Of course, pricing is a factor with businesses when it comes to borrowing, but the thing they tend to care about most is speed,” says OakNorth Bank’s Kristensen. “They need a quick yes or no decision. The opportunity cost of waiting several months for an answer can be very significant.”

Digital banks can achieve this speed with high levels of automation and speedy credit decisioning software and models. Behind the automated decisioning software, banks will run credit risk analysis to help inform their credit decisions. OakNorth Bank, for example, uses its parent company’s ON Credit Intelligence suite, which is also packaged up and licensed as a software-as-a-service (SaaS) solution to other banks.

“The major priority is further investment in technology-driven automation, as well as development and build-out of our in-app mortgage proposition

Rebecca Cartwright, Atom Bank



says Cartwright. “The major priority is further investment in technology-driven automation, as well as development and build-out of our in-app mortgage proposition. We constantly look at what upgrades and app updates would make the process better and ultimately result in optimal rates on our savings and mortgage products.”

Another objective for many digital banks is to increase the numbers of customers using their account as a primary, rather than an additional, account.

“At N26, our goal is that every improvement in our product excites and encourages customers to use their N26 account more and more as their primary bank account,” says Weber. The strategy includes moving beyond “everyday money management” into products that help customers grow their wealth, such as offering investment opportunities and automated savings functionalities. In Germany, N26’s most mature market, one in two customers that use N26 regularly use it as their main account, Weber says.

Achieving ever-higher levels of automation is key for most digital banks, which often view themselves as technology firms as well as banks. “We automate everything from our infrastructure to our access management with code,” says Thomas Grosse, chief banking officer and CRO at N26. “We model ourselves as a technology company with agile software development, which requires hundreds of deployments weekly.”

“Of course, pricing is a factor with businesses when it comes to borrowing, but the thing they tend to care about most is speed ... They need a quick yes or no decision. The opportunity cost of waiting several months for an answer can be very significant



Valentina Kristensen, OakNorth Bank

OakNorth Bank launched with a full banking licence in 2015 and targets what it calls the “missing middle” businesses, offering loans that range from £250,000 – the level where automated decisions generally stop – to around £70 million, where full bespoke analysis starts. By the end of 2021, OakNorth Bank had lent £6.9 billion (\$7.9 billion) to its 175,000 customers.

Quick customer onboarding is also a priority at Atom Bank. “We’re always looking to improve the speed and experience of customer origination,”

Cloud-native

In May 2016, OakNorth Bank became the first European bank to be fully cloud-hosted, paving the way for a multitude of others to follow suit. “We worked very closely with Amazon Web Services [AWS] and the regulators around things such as data continuity, privacy and security to help drive the change in the industry forward,” says Kristensen.

Prior to that, the regulatory environment had not existed in Europe that allowed banks to have their core systems in the cloud. A core banking system, or platform, is the software used to support a bank’s most common transactions, such as lending and servicing loans, opening new accounts, processing deposits, withdrawals and payments, managing customer accounts, establishing interest rates and calculating interest.

Building an IT stack from scratch in the cloud gives digital banks a huge advantage over traditional banks, which usually have numerous legacy systems and integration challenges.

“There are many benefits to building your tech stack from scratch [in the cloud],” says TymeBank’s Paveley (see box, *Benefits of being cloud-native*). Firms can avoid the “expensive, time-consuming and risky” task of migrating data from an on-premise system to the cloud, which is also complex from a regulatory perspective. It increases firms’ access to next-generation architecture solutions and allows features to be built and released to customers more quickly.

Benefits of being cloud-native

- Avoids the technological and regulatory challenges of moving data to the cloud
- Cost-efficiency: pay only for what you use, switch components on and off
- Flexibility: the ability to change and add components
- Significantly increased speed
- Joined-up systems and increased access to next-generation technology
- Exponentially greater data storage
- Improved data retrieval and analysis, and better access to machine learning technologies
- Scale businesses rapidly

“The big data way – extract, transform, load – allows us to dump all the data in all its forms, including unstructured data, into the data lake and transform when we know what questions we want to ask. The cloud really helps with that



Andy Sturrock, Atom Bank





There are also cost advantages. “With the cloud we only pay for what we need, and can dial up and down depending on our growth,” says Neil Evans, head of credit risk at OakNorth Bank. “There’s a lot of flexibility that we simply wouldn’t get if we weren’t cloud-hosted.”

Being in the cloud also allows new ways of working with data, including a move away from the extract, transform, load model in which data is transformed before being loaded into storage, says Andy Sturrock, CTO at Atom Bank. “The extract, transform, load method is fine as long as you know exactly what questions you want the data to answer. Otherwise you risk discarding data you might need later,” says Sturrock. “The big data way – extract, transform, load – allows us to dump all the data in all its forms, including unstructured data, into the data lake and transform when we know what questions we want to ask. The cloud really helps with that.”

The cloud also allows digital banks to scale rapidly. N26 was another early mover when it came to transferring its core banking business into the cloud. “Doing this at a time it was not industry standard in banking allowed us to scale our business at speed as we continued to build out our product,” says Grosse. “Without legacy systems, owned infrastructure or costly branch operations, we’ve been able to rapidly scale and grow from the moment we obtained our own banking licence in 2016.”

Being fully in the cloud certainly helps when it comes to costs. In this financial year, Atom Bank, for example, grew its income by more than 200%, but costs rose by just 6%. Being highly automated and in the cloud played a part in this, says Cartwright. “We don’t have branches and aren’t weighed down by legacy tech like other big banks,” she says. “Our digitally native model allows us to be lean and keep headcount low, so we can control our costs while simultaneously growing the business.”

She adds that Atom Bank’s relatively low costs are also down to its focus on saving and lending – activities that drive revenue – rather than transactional banking, which creates costs.

“ We worked very closely with AWS and the regulators around things such as data continuity, privacy and security to help drive the change in the industry forward



Valentina Kristensen, OakNorth Bank

Banking platforms

Many digital banks will partner with a core banking platform provider – Alkami, Finflux Fintech OS, Mambu or BankPoint, for example – as a way of launching their services.

Digital banks work with these fintech companies to varying degrees. At one end of the spectrum, they build everything online themselves and, at the other, outsource all their core banking to a platform provider. Many digital banks inhabit the middle ground, where they partner with a banking platform while building a lot of their own tech stack around it.

Atom Bank, for example, uses Thought Machine for its core banking platform and builds its own intellectual property on top. “You need to make a decision where in the stack you want to be,” says Sturrock. “It’s about how flexible you want to be versus how much work you want to take on in-house.”

Growth and scalability

Building an IT stack in the cloud allows digital banks to start with the bare essentials and build out later as the business grows. When TymeBank built its IT platform on AWS, its main priority was designing its products to be accessible to customers. “The main driver for us is availability of our products to customers – that must always work. So reliability and resilience are essential,” says Paveley.

To achieve this, the bank looked to enhance its technology stack, which it continues to refine. “We are always looking at the new features and functions [AWS] supply,” says Paveley. “This allows us to evaluate almost on a monthly basis where we can enhance our builds to enable our growth and customer acquisition strategy.”



Case study: the growth journey of a neobank for SMEs

OakNorth Bank was founded by Rishi Khosla and Joel Perlman, two entrepreneurs who had first-hand knowledge of the difficulties of scaling-up small and medium-sized businesses to secure the loans they needed. The firm was set up specifically to lend to an underserved group of companies that required a banking licence to benefit from funding via retail deposits. This required the firm to work closely with the UK's Prudential Regulation Authority and the Financial Conduct Authority to apply for a UK banking licence.

"We needed to show the regulator that we had a clear plan for our system development and origination business to demonstrate we had the bones of a business in place – the right people, the right systems, the right processes – and that the hypothesis of our business model would work," says Neil Evans, head of credit risk at OakNorth Bank. "We had a pretty clear vision from the outset of where we wanted to get to, including entry into the cloud."

The bank's initial tech stack included players such as Mambu, nCino (part of the Salesforce platform) and OakNorth Bank's own commercial lending software (the ON Credit Intelligence Suite²). It has since evolved and developed further to include the likes of ComplyAdvantage and True Layer – all of which are hosted on the cloud. "We set up manually at first, but with every intention to grow our tech stack as we grew the size of the book. We had already started to build our back-office and web-based systems so we were ready to move into the cloud when the timing was right," says Evans.

In March 2015, OakNorth Bank was granted its banking licence – only the third granted in the UK in 150 years – and given approval to start operating on a 'mobilisation' basis. After exiting mobilisation and officially launching in September 2015, OakNorth completed around £15 million (\$18.38 million) in loans by the end of the year.

In May 2016, it became the first European bank to be fully cloud-hosted.

By the end of December 2016 – the bank's first full year of operation – it had lent £276 million (\$308 million).

"It was fast growth, so we had to be ready for it, but at that size it was still possible to keep all the data we needed easily in one Excel spreadsheet," says Evans.

In the following years, the bank more than doubled the number of borrowers and the level of debt on its balance sheet each year. Loans rose from £900 million (\$1.1 billion) in 2017 to £3.1 billion (\$3.80 billion) in 2019 to £4.2 billion (\$5.14 billion) in 2021.

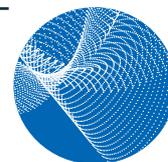
"It grew quickly, and the system had to be able to support this and enable all the new system updates required," says Evans. "It had to quickly accommodate new solutions that helped our origination as well as portfolio management, and then be able to add things in as new issues appeared: for example, climate scenarios."

Today the bank has over 175,000 savings customers with £3.3 billion (\$4.04 billion) in deposits, and several hundred commercial borrowers across the UK. It has lent £8.5 billion (\$10.41 billion) since inception.

175,000
savings customers

£3.3 billion
in deposits

£8.5 billion
lent since 2015



Notes

² OakNorth (2022), ON Credit Intelligence Suite™, <https://bit.ly/3P9qGH>

Data

As digital banks expand, so do their data requirements. “The data we needed to start with was reasonably narrow,” says OakNorth Bank’s Evans. “The initial focus was on the key credit data needed for our regulatory reporting. As we’ve built the business, we’ve increasingly wanted to be able to better understand the market and analyse the efficiency of our own processes.”

The business wanted to understand, for example, where sources of introduction were coming from and to see statistics on repeat business. “Those are things that you can’t find in other bigger banks very easily,” he says. “Our system can ingest data from individual borrowers at the beginning and feed it through to our back-office system.”

Machine learning has helped the bank move beyond simple data capture and storage to achieving better retrieval of data, says Evans. “We are able to respond, for example, to queries from investors or the regulator in days rather than weeks and months. This is because our data extraction is either ahead of the curve already or easily able to adapt to new requests or new economic scenarios.”

As well as analysing its internal data, OakNorth Bank sources “hundreds of different datasets” from an enormous variety of sources, says Evans. “We try to really understand our customers’ business at a very granular level using data and analytics to build up a very detailed picture, and then combine that with scenario analysis to constantly develop a forward-looking view of individual borrowers and how they might be impacted under certain scenarios, so we can determine the risk in our book.”

As well as obtaining data from public bodies such as the UK’s Office for National Statistics, OakNorth Bank also sources very specialist data in niche areas. “There are many areas you don’t necessarily think of straight away as a data source that might be of use,” says Evans.

He gives the example of a European potential SaaS client that needed finance for a hotel in Spain. Overnight, the credit team produced a view of the hotel market in Barcelona. Part of that involved looking at the numbers of passengers coming through Barcelona airport and analysing how they split into different countries and what happened at different times of the year to indicate occupancy levels in Barcelona hotels at different times.

“Our data system is able to bring all of these formal and informal datasets together and apply an average, aggregate view,” says Evans. “It goes beyond traditional credit metrics such as loan-to-value and debt service to take in key performance indicators of businesses, and hence massively enhances the quality of decisions we are able to make.”

As client information comes in a slew of different formats, data formatting and normalisation are essential, he stresses.

Atom Bank’s Cartwright sees obtaining data around climate risk as the next big focus for digital banks. Again, being cloud-based gives digital firms an advantage when it comes to processing the huge swathes of data needed for climate risk analysis, she says. “I think being cloud-native and more agile, we have the edge over larger, more manual entities when it comes to analysing our clients’ creditworthiness against transitional and physical climate risk.”

“The initial focus was on the key credit data needed for our regulatory reporting. As we’ve built the business, we’ve increasingly wanted to be able to better understand the market and analyse the efficiency of our own processes

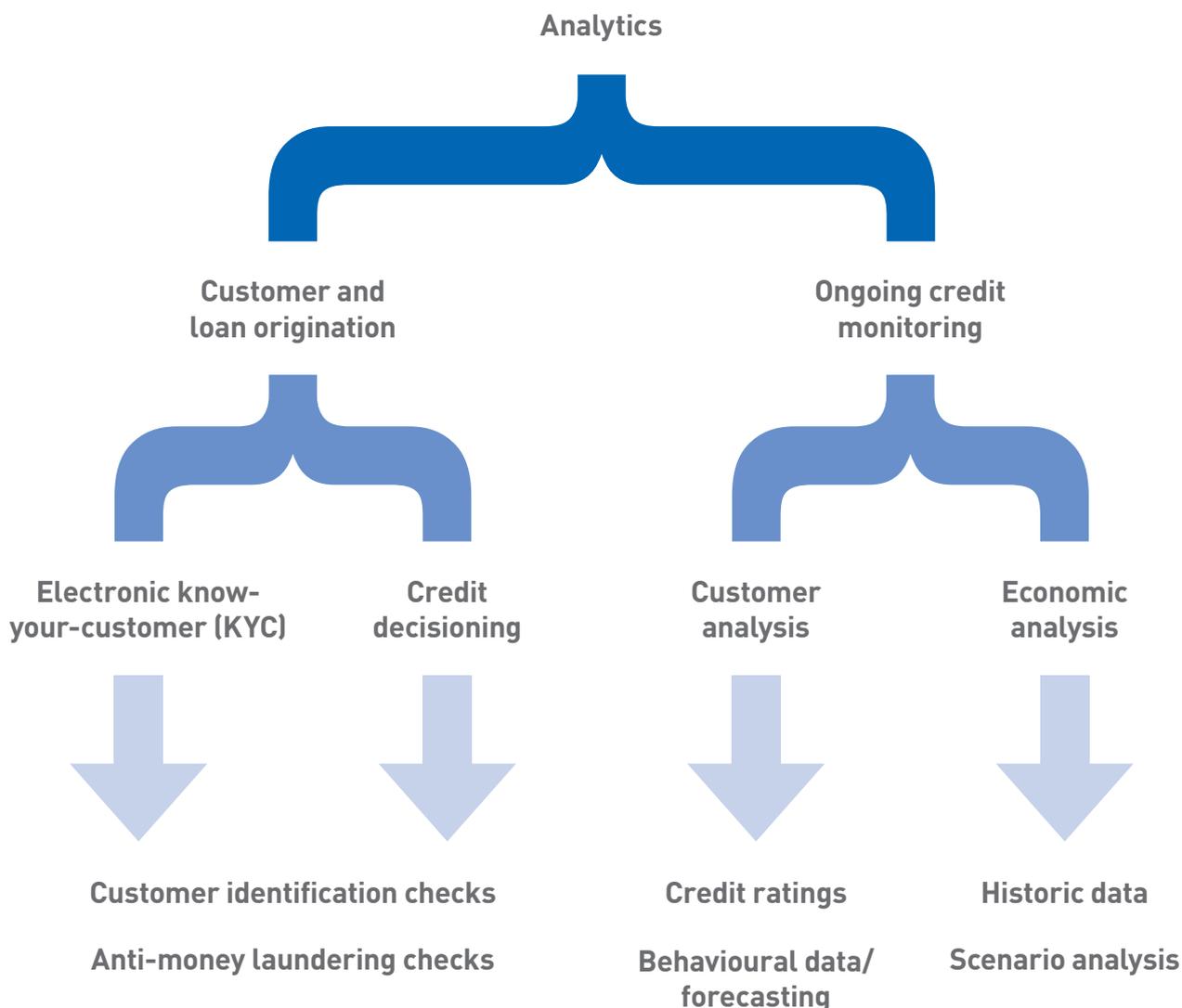


Neil Evans, OakNorth Bank

Analysis

OakNorth Bank’s Evans describes two distinct types of analysis, illustrated below: first, customer origination and ensuring the credit decision is the right one from the start; and, second, monitoring the loan book and applying scenario analysis.

“Applying this forward-looking analysis allows us to review our entire portfolio every month and pick out any cases that could be a concern six or 12 months down the line, rather than yesterday or three months ago, as happens in a lot of other banks,” Evans says.



Both Atom Bank and OakNorth Bank do their own modelling, stress-testing, scenario analysis and credit risk analysis. But, as many digital banks are under 10 years of age, they will need to obtain historical data externally to analyse longer-term economic trends and customer behaviour.

It is important that historical data is overlaid with analysis of the current environment, says Atom Bank’s Cartwright. “Today we have a whole generation of borrowers who have never experienced high inflation and interest rates. So behaviourally, how they look at their discretionary spend versus essential spend, may be different and we, as a digital bank, need to be really conscious of that because, by the very nature of being digital, our demographic tends to be a younger demographic,” she says.

Regulation

Another factor hugely affecting the technology build of digital banks is regulation. Keeping up with the nuances of financial regulation in different jurisdictions – most of which originates from before the digital era – is an ongoing technology challenge. “Some of the legacy regulatory policies are very local in nature and create challenges in our pursuit of building a strong and modular technology platform,” says N26’s Grosse.

In Europe, examples include different local regulations around KYC rather than a common European Union standard. Payment systems and methods also differ across countries. “[These] must be individually addressed as part of our product to truly resonate locally,” says Grosse. Credit scoring and regulations also function differently across markets, meaning credit products must be approached differently across borders, he says.

N26 considers it essential to have regulatory expertise in-house. “A big focus for us is strengthening our bench of internal experts, who focus not on a single market or sector, but have a broader view of regulation and the way it impacts us as a fully digital pan-European business in a landscape where regulation is built around banking as a nationalistic industry,” he says. In addition, for bigger European markets or markets with higher complexity, the firm employs staff that liaise specifically with those regulators. In some cases it will also partner with “recognised and industry-leading partners” who can provide further expertise on relevant topics.

“**We don’t have the same regulatory resources and huge teams as large banks, so having to comply with similar rules around regulatory reporting, for example, is a huge strain on our resources**



Valentina Kristensen, OakNorth Bank

Capital Adequacy rules, for example, is extremely onerous, with much at stake. Miscalculations could either mean a bank falling foul of the regulator or tying up capital unnecessarily. A huge amount of data is required for the calculations, which could be extremely manual, slow and prone to error without the right tools.

This is one area in which digital banks might turn to third-party tech firms for expertise. Certainly, some digital banks look for technology offerings that include specialist expertise in certain areas such as regulatory reporting. “We partner with technology suppliers that are industry experts,” says TymeBank’s Paveley. “This de-risks our business, improves our delivery, and keeps our teams very small and costs low.”

“**Some of the legacy regulatory policies are very local in nature and create challenges in our pursuit of building a strong and modular technology platform**



Thomas Grosse, N26

Additionally, financial regulation – particularly regulatory reporting requirements – put a greater load proportionately on smaller banks than bigger banks with large regulatory teams.

“We don’t have the same regulatory resources and huge teams as large banks, so having to comply with similar rules around regulatory reporting, for example, is a huge strain on our resources,” says OakNorth Bank’s Kristensen.

Calculating capital requirements under Basel III’s

“**We partner with technology suppliers that are industry experts ... This de-risks our business, improves our delivery, and keeps our teams very small and costs low**



Bruce Paveley, TymeBank

Conclusion

Digital banks are certainly facing tough times ahead, and there is likely to be consolidation and possibly even bankruptcies to come. How well digital banks can harness technology to create resilience will be key in determining how they fare.

Embracing continuous technological change is vital, says Atom Bank's Sturrock. "Keeping up with new technologies and solutions is essential because staying static is effectively going backwards these days," he says. "Every firm has to be a digital company to survive, let alone thrive. The key is to embrace continuous technological change, not moving forward in big leaps then staying static, but incremental and sustainable change."

With the number of digital banks still growing rapidly, firms are facing not just testing economic times but also increased competition. What is clear is that digital banks need technology that not only supports the growth of the business but also enables accurate identification and analysis of growth opportunities and risk mitigation going forward.

“ What is clear is that digital banks need technology that not only supports the growth of the business but also enables accurate identification and analysis of growth opportunities and risk mitigation going forward



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