



THE FUTURE

OF MONEY, FINANCE AND BANKING

AN INNOVATION THESIS

FinTech
Venture
Studio

 **BARCLAYS** | RAINMAKING



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Foreword

This Innovation Thesis, the first of its kind published by Barclays, explores the seismic shift financial services is facing and the driving forces behind it, and highlights the themes we consider will prove most relevant in the coming years.

The pace of change in consumer expectations and technological development is unparalleled to anything we have seen before and provides financial services with new unfamiliar competitive threats as well as potential new models for growth and success. I believe that only those willing to experiment, test at pace and quickly collaborate with partners will be able to develop and distribute new digital products and services and tap into avenues of long-term growth.

I am happy to say Barclays is no stranger to collaboration and has invested in the fintech ecosystem for over a decade. We have over 120 fintechs co-located with Barclays at any one time in our Rise hubs in London, New York and Pune, and a leading-edge portfolio of innovation programmes producing the largest single-bank alumni of early-stage fintechs with a market cap of \$7.8 billion in 2021. Our heritage in this space, coupled with our over 300 years of deep banking subject matter expertise, gives us an unrivalled opportunity to build a portfolio-based approach

to the future. The latest addition of the Barclays FinTech Venture Studio powered by Rainmaking, codifies and scales Barclays' capability to partner and co-create with fintechs rapidly in an 'always on' approach. This crucial enabler builds pipeline capability in areas of short-term predictable growth and longer-term, high volatility 'moon shot' opportunity spaces.

The identified themes of Future of Money, Future of Finance and Future of Banking in this report showcase new business models, technology and distribution pathways, creating more opportunities than ever before to add value and engage clients in new ways. Barclays is ready to learn, collaborate and evolve, are you?

If you're building innovative solutions to harness these opportunity spaces, we want to hear from you.



Stephen Flaherty
Chief Technology Officer,
Barclays



Introduction: Five drivers of change

Financial services has been undergoing a major transformation for several years now, but the breadth as well as the speed of change is steadily accelerating. Five key drivers are pushing transformation at a faster pace than ever before.

- 1.** Accelerating customer expectations in the New Digital World

- 2.** Shifting demographic-economic realities and new ways of working emerging

- 3.** Innovative technologies reaching commercial maturity

- 4.** Exponential rise in data availability and range

- 5.** New business models rewriting market dynamics

1. Accelerating customer expectations in the new digital world

Customer expectations for financial products and services have shifted amid accelerating digitisation in every aspect of life and business.

Consumers and businesses are now expecting:

- Highly customised financial products that more closely align to their financial needs
- Immediate, seamless experiences, embedded within their consumer journeys
- Financial offers contextualised to their circumstances, anticipated ahead of time and proactively serviced without prompting

Non-financial sectors are leading the charge. Every day, customers experience intuitive digital platforms (for example, Netflix, Spotify and Uber) that anticipate, recommend and deliver products in real time. As a result, consumers and businesses alike now expect financial products that offer the same level of customisation and allow for a frictionless process embedded within their customer journeys.

Moreover, customers increasingly expect financial products not only to be adapted to their lives, business circumstances and future aspirations, but also for those needs to be anticipated and proactively serviced without any prompting.

2. Shifting demographic-economic realities and new ways of working emerging

Demographic changes, a widening disparity of wealth and the global pandemic have accelerated the transition to new ways of working in a digital age.

As a result of the global pandemic, gig workers and the number of small businesses are on the rise, including in very traditional industries. New digital platforms are fuelling this transition, by providing easy access to operations, customers and networks. Historically, these segments haven't been well served, but their fast growth is now making them a high priority for financial services providers.

Digital nomads and gig workers have proliferated in the creator economy for the last five years.¹ The COVID-19 pandemic accelerated this trend and expanded it into new sectors, as many businesses and individuals were forced to reconsider how they made a living. The number of 'solo-workers'² and small businesses has increased in both 'digital-first' and more traditional industries (e.g. law, recruitment and healthcare).

The emergence of new digital platforms has been a key enabler of this transition. Technology stacks are being developed to create easy access to operations, customer acquisition and networks for gig workers or small businesses, effectively replacing the need for traditional corporate or institutional environments.

Due to their small sizes and specific needs, solo workers and small businesses have traditionally been underserved by financial service providers. They struggle to access options that meet their needs: upfront capital to secure office space and procure inventory; working capital to grow and manage payroll; negotiation power to secure benefits and insurance for employees, and more. When they do, they face legacy systems and processes, as well as expensive offers. Fifty-seven percent³ of SME credit applications are unsuccessful because they are too difficult to complete or are ultimately rejected.

¹. [Trades Union Congress \(2021\)](#)

². [National Bureau of Economic Research \(2021\)](#)

³. [Fintech Finance News \(2021\)](#)



3. Innovative technologies reaching commercial maturity

A number of innovative technologies are reaching maturity, accelerating new product innovation and the creation of new business models.

APIs, artificial intelligence and machine learning (AI/ML), low code development and distributed ledger technologies create new ways to tackle previously unsolved and high-impact problems for businesses, consumers and institutions:

- **APIs** enable data sharing at scale and embedding products in third-party tech stacks more easily and faster than ever
- **AI/ML** is now widely adopted by institutions, with tech players such as Amazon, Alphabet and Netflix leading the way.⁴ The maturity of these technologies has allowed increased personalisation through more contextual, responsive and predictive insights into customer behaviour. Real-time data processing also enables dynamic responses to changing needs

- Low code technology allows organisations to build custom applications with minimal or zero coding effort. Low code is now widely adopted beyond financial services and leading financial institutions have used it to accelerate time to market
- Distributed ledger technology (DLT) infrastructure is scaling, with leading tech companies and financial institutions actively exploring decentralised networks to leverage efficiencies. Public smart-contract blockchain networks (also known as permissionless blockchain), such as Ethereum, are driving a new wave of disruptive decentralised finance products. Increased maturity and accessibility are driving enterprise adoption in and beyond financial services

4. Exponential rise in data availability and range

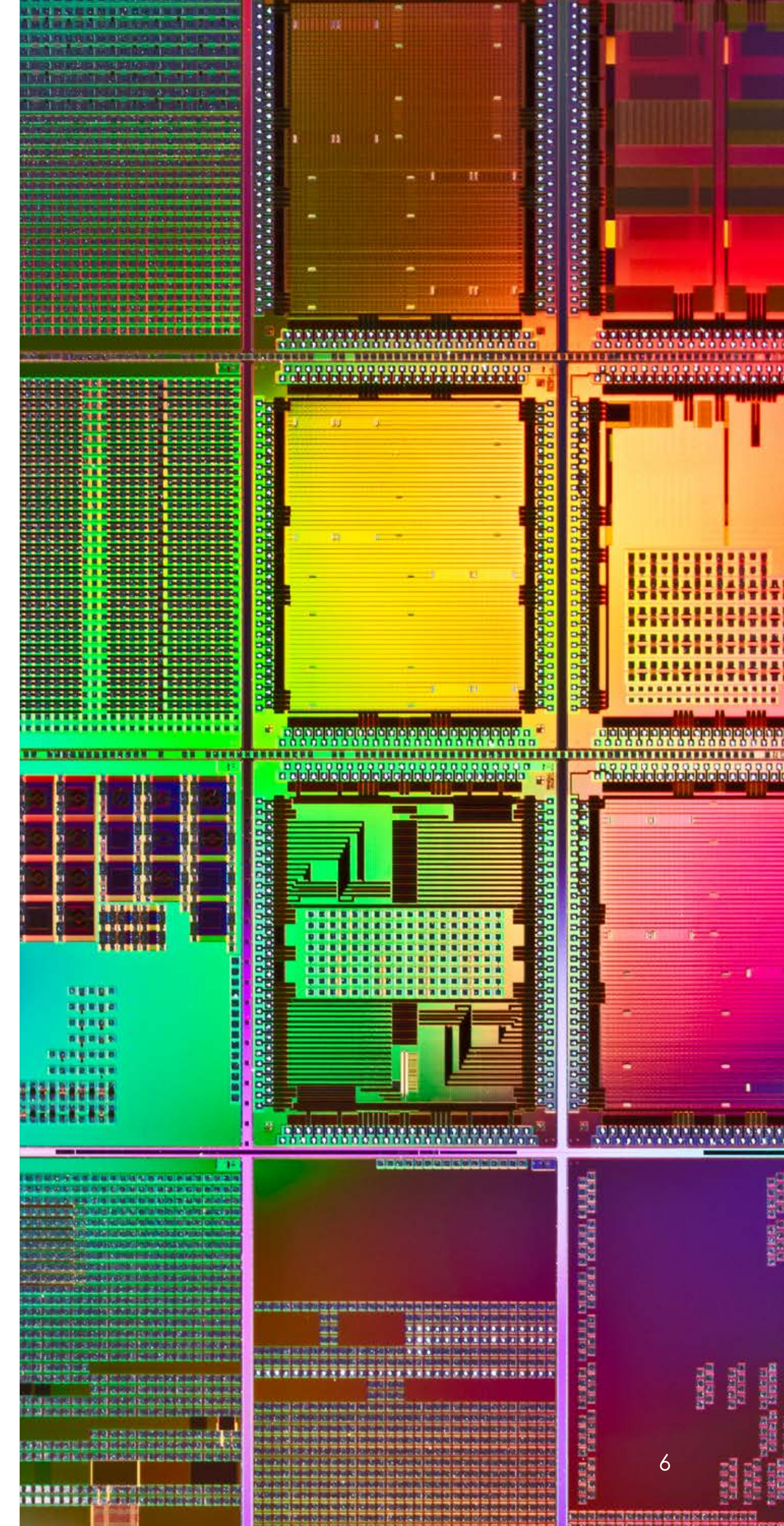
The data required to fuel technologies is more readily available today thanks to mainstream adoption of Open Banking and alternative data pools.

Democratised access to large amounts of deep data from Open Banking, as well as alternative and big data sources, increases the usefulness of the underlying technologies and fuels innovative business models.

Mainstream consumer and business adoption of Open Banking is generating a sizable amount of accessible data.⁵ This, in turn, facilitates new product development (especially in payments) and better operational efficiency, and fosters collaboration across financial services. Alternative datasets are also enhancing traditional financial information to provide a more comprehensive picture for decision-making in areas such as lending.

4. Spiceworks (2022)

5. OpenBanking.org (2022)



5. New business models rewriting market dynamics

Emerging new business models are fundamentally shifting market dynamics and the financial services value chain.

Fintechs have been leading the way by offering seamless customer experiences, targeted offerings and competitive pricing. The widespread adoption of Open Banking has allowed fintechs that initially focused on niche needs to quickly expand into financial 'super apps', covering a large spectrum of financial needs (these are, generally, mobile applications that give access to many types of financial services and come with embedded communications). The shift is ongoing:

- Embedded finance is seeing continued growth driven by non-financial companies addressing under-served industries
- Decentralised finance (DeFi), although still nascent, is seeing fast adoption

Fintechs are constantly striving to offer new frictionless customer experiences, targeted product offerings and lower pricing.⁶ Their ability to pivot and iterate quickly has allowed them to rapidly bring new products to market⁷ and outpace traditional players in product innovation.

In response, banks have been investing in digital tech stacks to create their own 'super-app' experience through Banking-as-a-Platform (BaaP). Individual consumers and business clients can now access a variety of third-party fintech offerings from their banking apps, in addition to traditional core banking services.

There is still some way to go. Banking-as-a-Service (BaaS) will need further focus and investment to support the growth in embedded finance solutions and allow more businesses to meet the financial needs of their customers. Embedding platforms can leverage data networks to offer captive customers a personalised, disruption-free digital experience.

While platform banking and embedded finance are maturing trends, DeFi is also unlocking a new wave of disruption. Public, smart-contract blockchain networks have allowed the launch of DeFi products that consumers and businesses can directly access without engaging with a banking intermediary.

⁶. PwC (2019)

⁷. Finextra (2021)



Three thematic areas of impact for the FinTech Venture Studio

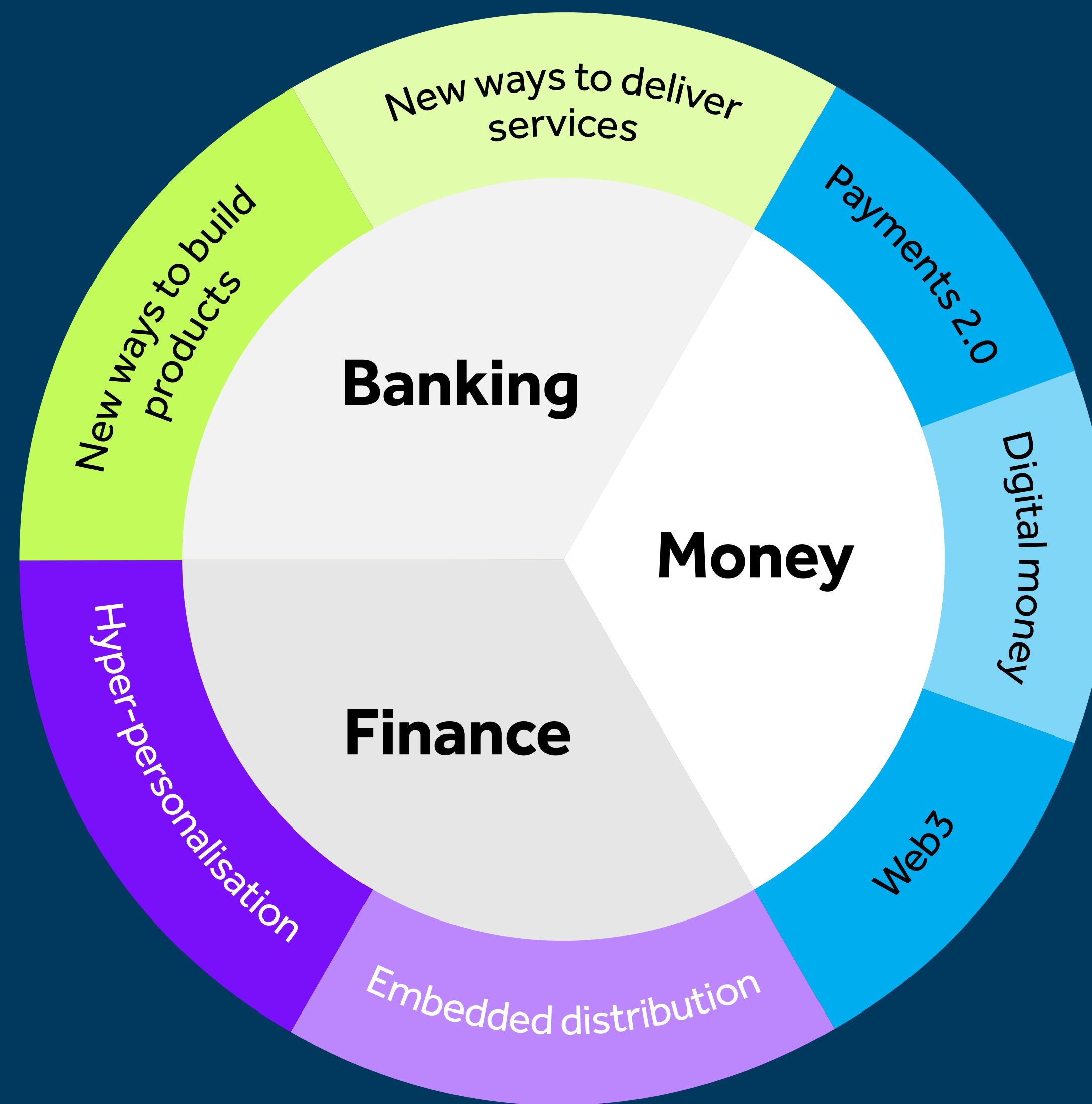
In response to the fundamental shifts caused by the five drivers, every step of the financial services value chain must evolve.

These changes will impact every product vertical, customer segment and market participant. In particular, three themes will prove most relevant in the upcoming years:

- The future of money: payments 2.0, digital money and beyond
- The future of finance: personalised and embedded
- The future of banking: harnessing technology to build the bank of the future

At the Barclays FinTech Venture Studio powered by Rainmaking, we believe that innovation in these areas will be accelerated through the collaboration between established players and fintechs who have the ability to build at pace and leverage new technologies and business models to help us push boundaries.

The key themes this report explores are just the beginning for the FinTech Venture Studio, and our Innovation Thesis will constantly evolve to respond to the ever-changing market forces.



The future of money: Payments 2.0, digital money and beyond



In the future, how will businesses and consumers interact with money, both traditional fiat and new digital currencies?

New product innovation targeting business-to-business (B2B) fiat payments has been limited, particularly for small and medium enterprises (SME).

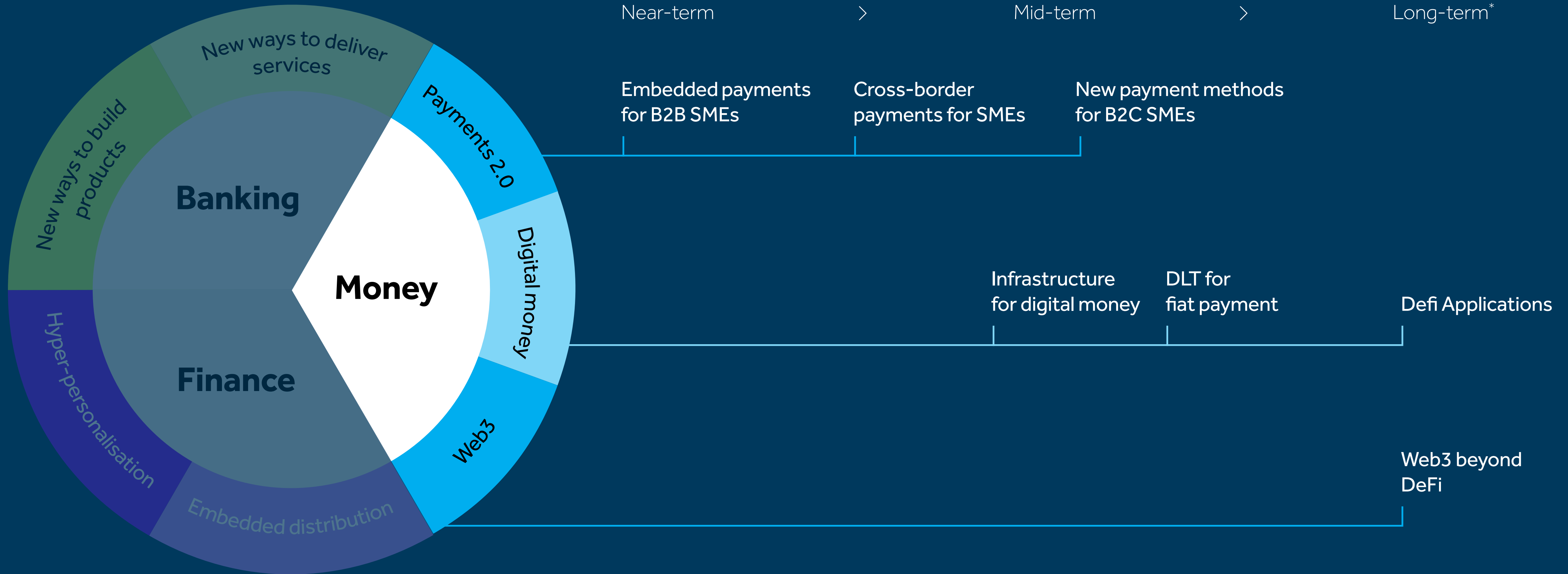
We see a tremendous growth opportunity in developing new online payment solutions that better suit B2B payment use cases and unique SME needs. New payment methods and business models can meet these needs when they are built on top of Open Banking and alternative data to deploy at scale for business payments.

Moreover, the adoption of digital money and DeFi products is accelerating and could reach a critical tipping point in the next three to five years. So far, they are mainly used by niche and early adopters, but more mainstream customers could start relying on these alternative products to access financial services. We also see evidence of increasing institutional appetite for leveraging DLT across a number of areas.⁸ At the FinTech Venture Studio, we are looking to experiment and pilot DLT infrastructure and solutions to unlock faster and cheaper fiat payments for banking customers and clients while exploring banking and efficiency savings.

Innovation in B2B solutions is lagging consumer payments, yet the potential for growth is significant

⁸. [Asset Servicing Times \(2022\)](#)

The future of money



*FVS focus

5.6 million

SMEs in UK⁹

£2.3 trillion

Annual SME turnover in UK⁹

50%+

SME share of private sector turnover⁹

Payments 2.0: B2B and SMEs in the spotlight

B2B and SME payments will see more innovation and growth through embedding new technology and new cross-border solutions.

In recent years, innovation in payments has been fostered by:

- Significant uptake of digital shopping
- Mainstream adoption of Open Banking
- New payment methods (e.g. account-to-account payments)
- Modern transactional infrastructure (e.g. faster payments)

While consumer payments have greatly benefited from this transformation, new product innovation targeting business payments has been limited, particularly for SMEs.

SMEs are a significant segment of the UK economy: the 5.6 million⁹ UK SMEs account for a £2.3 trillion⁹ turnover, which is over half of the private sector. Yet, they struggle to access capital and financial services, fraud protection and efficient cross-border payments solutions. The \$5 trillion SME funding gap¹⁰ is largely driven by late payments for B2B SMEs, whilst SMEs operating internationally face \$100 billion of annual unhedged FX risk.¹¹

A number of new technologies in embedded payments, such as Open Banking and fintech solutions, have emerged, but they are yet to be deployed at scale for SME use cases. However, there are opportunities in the future of fiat money payments that will leverage these technologies to address the issues of cost and access for B2B and SME payments. Although we see new fintech solutions begin to address this in other areas, both the B2B and SME markets remain relatively underserved, suggesting significant opportunities to develop solutions.

Innovation in B2B solutions is lagging consumer payments, yet the potential for growth is significant. B2B Buy Now, Pay Later (BNPL) is 2.5x larger than consumer BNPL, with higher growth rate¹², whilst B2B SME lending in Europe is estimated to be more than five times¹³ that of the business-to-consumer (B2C) market. SMEs have more need than ever for broader, cheaper and quicker access to capital.

We want to explore leveraging these emerging technologies and business models to help support businesses make payments to each other.

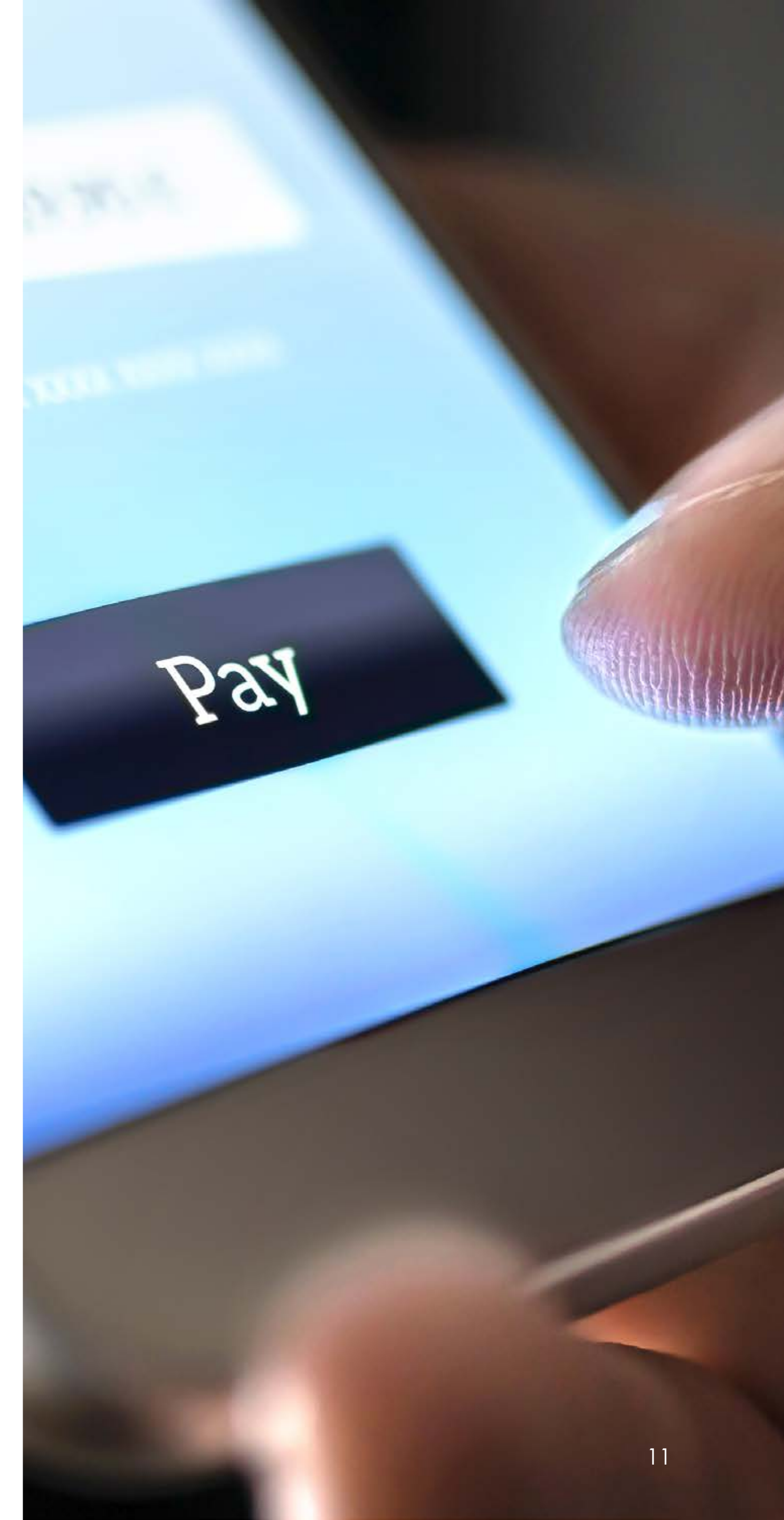
⁹. [Startups.co.uk \(2022\)](#)

¹⁰. [Trade Ledger \(2022\)](#)

¹¹. [Medium \(2022\)](#)

¹². Sifted Conference - Billie - Matthias Knecht - Cofounder and Managing Director

¹³. [Fintech Futures \(2022\)](#)



Only 4%

of UK SMEs protecting themselves from currency risks¹⁵

Sector spotlights

Embedded payments for B2B SMEs

How can SMEs get paid faster and avoid late payments?

Combining instant payments and integrated financial solutions could help create a seamless flow of payments between businesses, by embedding payments (or financing) at the point of need.

UNIPaaS (Seed, \$10 million)¹⁴

A payment solution provider for digital marketplaces and B2B SaaS companies. Their embedded payment stack helps B2B businesses integrate and handle payments and multi-vendor transactions. They support SME cashflows by providing instant payment through Open Banking, automated invoices and payment requests.

Cross-border payments for SMEs

How can SMEs cut costs on cross-border payments?

Cross-border payments tend to be slow and expensive for businesses operating internationally. The impact is even stronger for SMEs, which suffer from higher transaction costs and more challenging FX execution and hedging. FX hedging can be confusing and complicated for the average SME, with only 4% of UK¹⁵ SMEs protecting themselves from currency risks.

Truly Financial (Pre-Series A, \$4 million)

A dedicated SME bank that has cross-border payments natively embedded into their core functionality. They are tapping into the new distributed workforce where your employees could be based worldwide, and you need to deliver payroll in multiple currencies.

New payment methods for B2C SMEs

How can SMEs manage, process and reconcile new payment methods to and from consumers in a cheaper way while protecting them against fraud?

Emerging payment methods, such as account-to-account (A2A – novel interfaces facilitating Direct-to-account payments), are helping merchants reduce transaction costs and fees. However, adding new payments solutions to the stack increases the cost and complexity of managing and reconciling payments for SMEs.

Pollinate (Series C, \$218 million)¹⁶

Helps SMEs reduce the operational costs of payment reconciliation by giving them better visibility on transactions, settlement and invoices, through one single data source for all digital payments.

3S Money Club (Series B, \$5.63M)¹⁷

Provides cross-border SME merchants with reliable and cost-effective payment solutions to support global trade and global customers.

¹⁴. UNIPaaS (2021)

¹⁵. IBS Intelligence (2021)

¹⁶. Pollinate (2021)

¹⁷. 3S Money Club (2023)

\$3.4 billion

10x YoY Growth VC investment in DeFi in 2021¹⁸

260%

Growth VC investment in DeFi Q1 2020 to Q1 2021¹⁹

€237 billion

Blockchain startups total valuation in 2021¹⁹

18x growth

Blockchain startups valuation growth 2016 to 2021¹⁹

Digital money and DLT

Digital money will open new ways for customers to pay, save, build wealth, borrow, manage finances and insure, while DLT can facilitate faster and cheaper fiat payments.

In spite of crypto-market volatility in recent years, both DeFi infrastructure and products built over it have been steadily growing.²⁰ Temporary changes in crypto valuations, however radical, have not impacted the transformative potential of the underlying blockchain technology.

Products built on DeFi networks (also referred to as Decentralised Finance, or DeFi, products) are gaining significant attention from investors. They are still at a nascent stage, but adoption has grown rapidly in recent years. Early adoption of DeFi has been concentrated around B2C applications of cryptocurrency payments, wallets, and savings. As the next advancement of DeFi evolves with traditional capital markets, there is also opportunity for applications to perform custody and settlements for SME financing, particularly SME's that do not naturally have large corporate treasury teams. Emerging players in this space will look to reduce the hurdle for small and mid-cap players that want to participate in the system but lack the extensive in-house resources to do so.

Institutions have also shifted towards decentralised technologies, increasingly investing in DLT pilot projects, and joining permissioned networks. To date, 13 of the world's largest banks have invested \$3 billion²⁰ funding into crypto and blockchain startups and projects. Eighty-percent of the world's central banks are also testing crypto technology. The Central Bank of India's 2022 pilot of both retail and wholesale CBDC's is one to watch as they test key assumptions that the digital rupee will facilitate cheaper and faster financial transactions while simultaneously protecting people from the volatility of private cryptocurrencies.

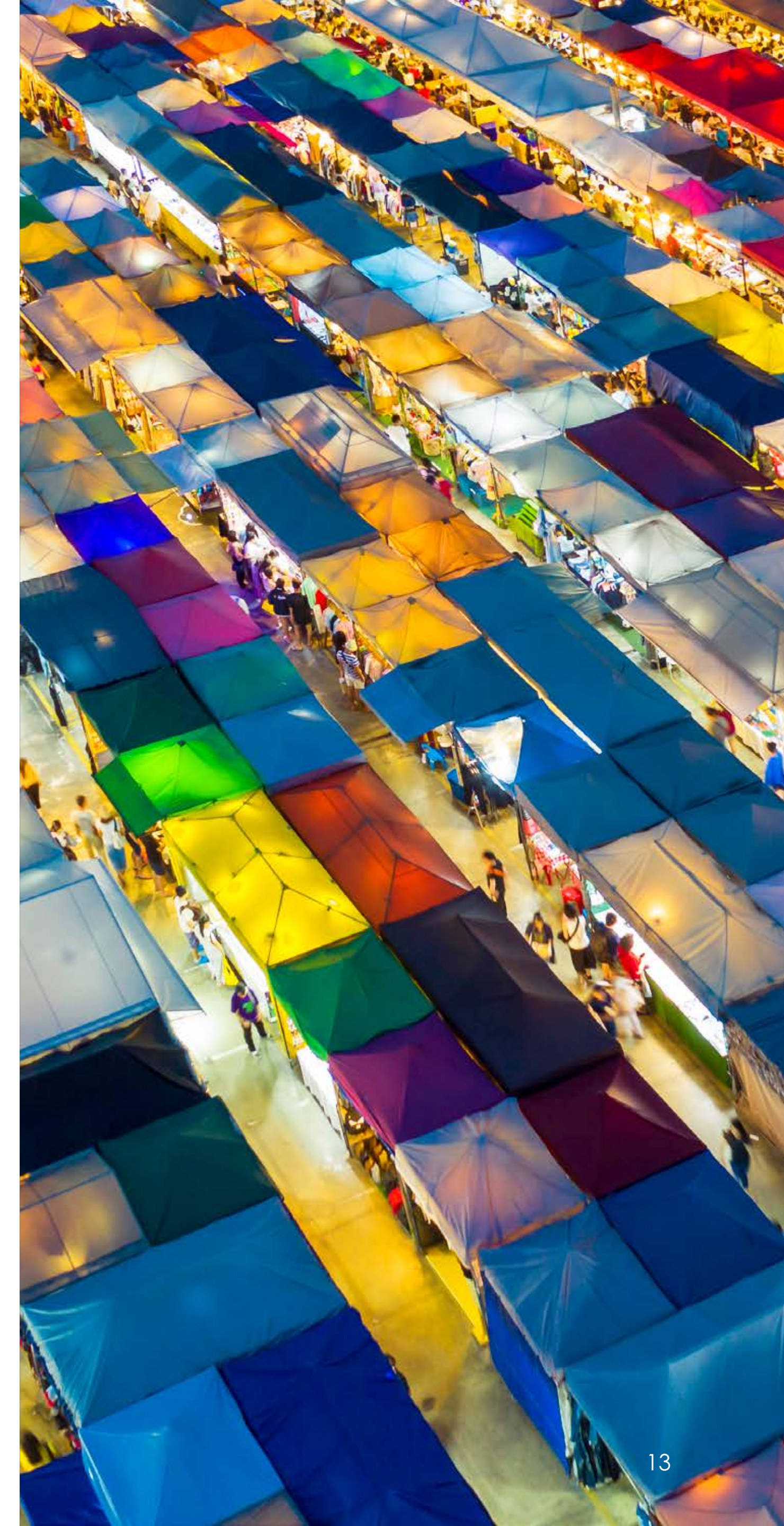
We are only at the beginning of the journey and expect new business models to emerge around DLT and blockchain in the coming years. These opportunities are nascent enough to be within reach, but the expected growth in adoption will bring forward the time horizon for commercialisation.

The future of digital money will leverage the underlying blockchain and DLT technologies as an enabler for both consumer products with high-growth potential and high efficiency gains for financial institutions. DeFi will also see more use cases and scale in adoption as roadblocks to adoption, such as accessibility, usability, scalability, and interoperability, start getting resolved.

¹⁸. CB Insights (2021)

¹⁹. Dealroom (2021)

²⁰. Business Insider (2021)



Over 1.7 billion
people remain
unbanked globally²³

Sector spotlights

DLT as an enabler in Payments 2.0

How can financial institutions reduce fraud and costs in the Payments 2.0 fiat universe with DLT infrastructure or solutions?

The growing incidence and cost of fraud is a known hurdle for the growth of digital payments, and cross-platform communication remains a challenge in the digital space. Verifying the identity and ownership of an individual, company or an item can be a slow, expensive and complicated process. A DLT-based system of digital identity has the potential to replace lengthy approvals and authentication chains with a more cost-effective and safe solution.

Key (Seed, \$3.5 million)²¹

Working on an integrated DLT identity management solution for businesses. Its multiple applications (signature, ID verification, payments, credit scoring, etc) can help reduce operational expenses by 95%.

Chainalysis (\$8.6 billion valuation)²²

Helps to manage DeFi risk, understand blockchain activity and make critical decisions for institutions managing smart contracts and DeFi transactions.

DeFi applications

How can underserved consumers and SMEs access financial services through new DeFi products?

Over 1.7 billion people remain unbanked globally.²³ Banked but underserved consumers – those who cannot access mainstream financial products – account for as many as 20 million adults in the UK alone, growing at a high rate due to the current macroeconomic environment.²⁴ DeFi applications built on top of public, smart-contract networks can be used as an alternative to traditional products for the underbanked or hard-to-bank customers, improving access to essential financial services for vast customer segments. There are numerous use cases on both the consumer and business side, such as with decentralised borrowing, building savings and wealth through staking and lending, insuring assets and cashflows, and managing finances and treasury.

As Decentralised Finance enters a new level of maturity and disruption, there are opportunities to explore in leveraging the products being developed to create easy, secure cost effective adoption of mainstream use cases for consumer and business payments and treasury management. There are Fintechs dedicated to reducing the burden of tapping into DeFi by sorting through the user experience behind ramps, settlements, custody and connectivity with providers.

On the consumer side, decentralised peer-to-peer lending platform such as:

Aave (Secondary market, \$49 million)²⁵

Compound (Stage unknown, \$33.3 million)²⁶

Both companies allow users to borrow funds with crypto assets as collateral and lend their crypto to other users in exchange for interest rates higher than in traditional finance.

On the business side, startups are leveraging DeFi to improve access to lending and finance for SMEs, while reducing barriers to cost, speed and efficiency:

Goldfinch Finance (Series A, \$25 million)²⁷

A decentralised credit platform is transforming access to capital by offering loans without collateral.

Pile Capital (Pre-seed, €2.8m)²⁸

Orchestrates the needed translation between institutions running on web2 (and prior) and DeFi apps built on web3 via APIs. Pile plans to help SMEs with access to faster international payment gateways and even the option to pay salaries in crypto.

21. Crunchbase (2023)

22. Reuters (2022)

23. The World Bank (2021)

24. Sifted Conference - Bloom Money - Nina Mohanty - Founder

25. Crunchbase (2023)

26. CB Insights (2023)

27. Fintech Collective (2022)

28. Sifted (2022)

\$2.9 billion

Web3 blockchain market in 2021²⁹

\$23.3 billion

Expected market size in 2028²⁹

On our watchlist: Web3 beyond DeFi

Frontier spaces in Web3 beyond DeFi are still nascent but show exponential potential.

Emerging business models in Web3 have strong potential to be highly transformational to the future of financial services and beyond. Those models are very new, but they are worth watching closely. The success of Web3 will lie both in technological capability as well as strategic approach. For Web3 evangelists a decentralised internet would change everything and see a raft of new business models and companies emerge. Tech giants would be unable to profit off personal data, and creators such as musicians can move off tech middlemen like Spotify and distribute directly to fans. However, critics say it will be difficult to overcome the 'Blockchain Trilemma' – the belief that blockchain networks cannot be secure, decentralised and scalable all at once.

Nonetheless, there are new startups emerging in this space and investment is flowing in with funding reaching \$13 billion in the first three quarters of 2022.³⁰

²⁹. Globe News Wire (2022)

³⁰. CB Insights (2022)

The 100+ companies building Web3³⁰

Access & identity

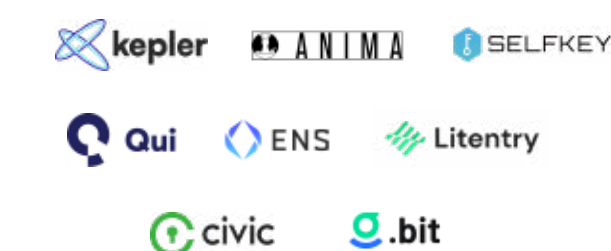
Wallets



Browsers



Decentralised digital identity



Decentralised finance

Decentralised exchanges



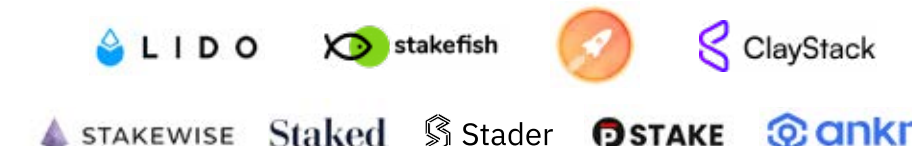
Decentralised exchanges



Lending



Staking



Experiences

Metaverse



Communities & fundraising



Music



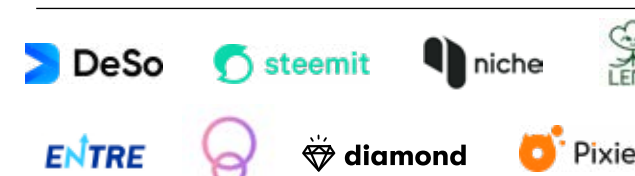
NFT marketplaces



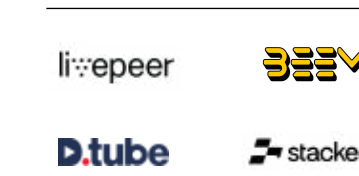
Content & publishing



Social media



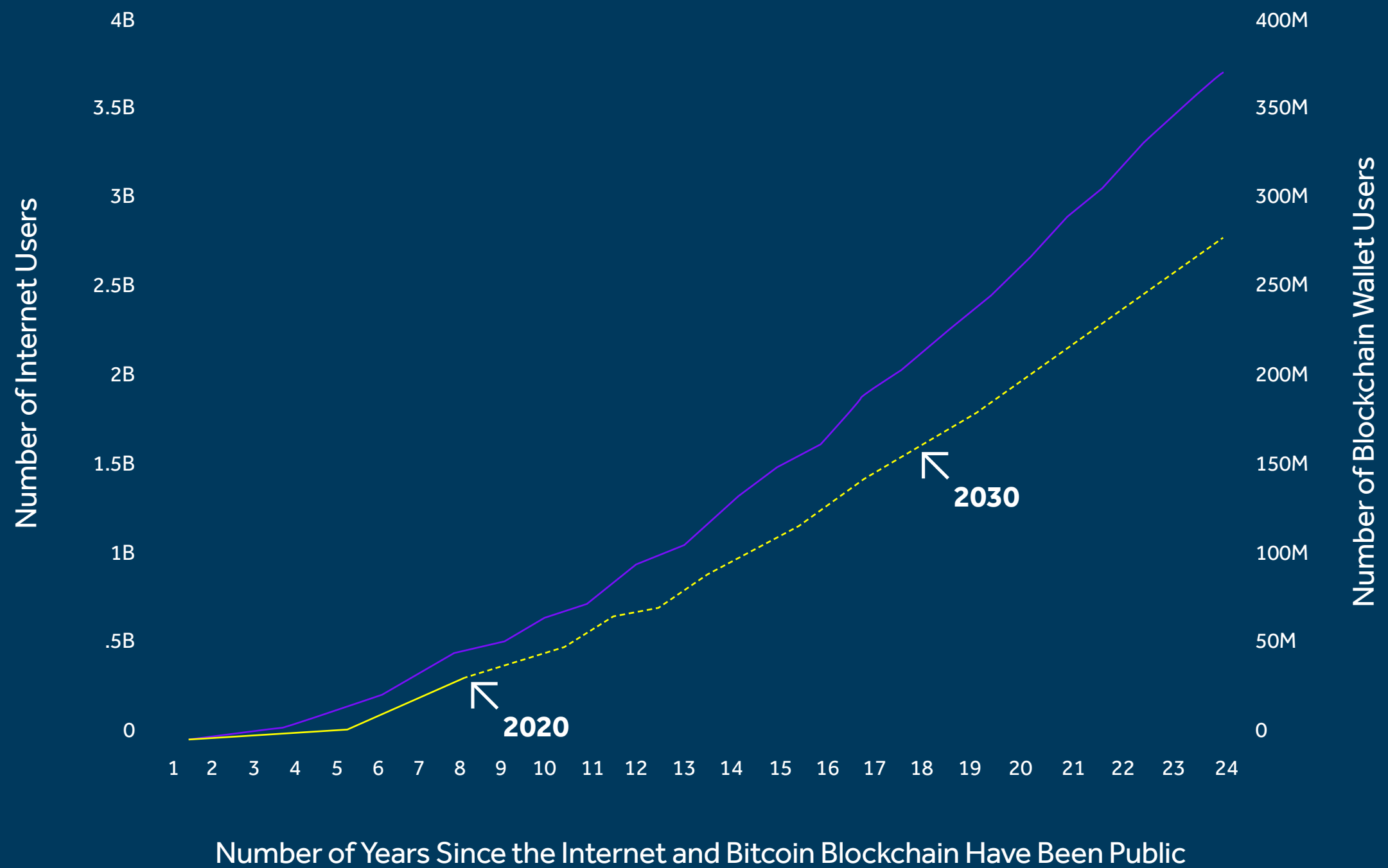
Video streaming



Play-to-earn



Adoption of blockchain wallet users expected to reach nearly 200 million by 2030³¹



Number of Internet users (lhs)

Number of Blockchain wallet users (rhs)

DB forecast of number of Blockchain wallet users (rhs)

Source: Deutsche Bank. Year one for the internet is 1991 and for bitcoin it is 2011. To forecast the number of blockchain wallet users, study authors applied the growth rate of the number of internet users.

³¹. A16z (2021)

Governments are increasingly investigating the space as well. Last year, the UK Government announced the launch of a series of regulations to promote stable-coins as a form of payment and currency across the country.³² The UK Government's Sandbox will be facilitating experimentation, testing and innovation among firms using DLT and other emerging technologies, as well as a partnership with the Royal Mint to produce NFTs.³³ As Web3 models begin to move into a regulated space, increasingly exciting developments start to capture the imagination of banks and their partners. Barclays has been exploring how architecture would need to evolve to mitigate potential fragmentation between Central Bank Digital Currencies and Commercial money. Not only did Barclays' Technology Office publish a paper³⁴ on this, but also hosted a Central Bank Digital Currency Hackathon where participants explored and experimented with potential solutions. Barclays have also recently launched their own external experimentation sandbox, The Barclays Experimentation Hub, further emphasising our commitment to collaborate across industry at pace.

The rate of innovation in the Web3 arena is so rapid, we cannot predict what the next five years will look like. But the true potential of Web3 has yet to be uncovered. What new use cases will be enabled through the convergence between AI/ML and blockchain? What would the world look like once nearly 30 billion IoT devices we expect to have by 2030³⁵ are all connected to blockchain networks? Will we really spend part of our lives in the metaverse? What will be the impact? Will creators, inventors, artists and scientists adopt Web3 models as their new way of monetising their IP, copyrights and patents? Will influencers, promoters and freelancers migrate from Web2 social networks like Instagram in favour of a more direct monetisation and community-based ownership model in Web3?

There are so many questions yet to be answered, but we are constantly looking for companies making strides in the more unexplored parts of Web3.

³². XR Today (2022)

³³. Gov.uk (2022)

³⁴. Chief Technology Office, Barclays (2022)

³⁵. Statista (2022)

The future of finance: **Personalised and embedded**

How can we improve the way we experience and deliver financial products to enable a broader spectrum of customers to build savings and wealth, access financing, manage their finances, plan for and insure the future?

Two key forces will drive the future of finance beyond payments: hyper-personalisation and embedded distribution.

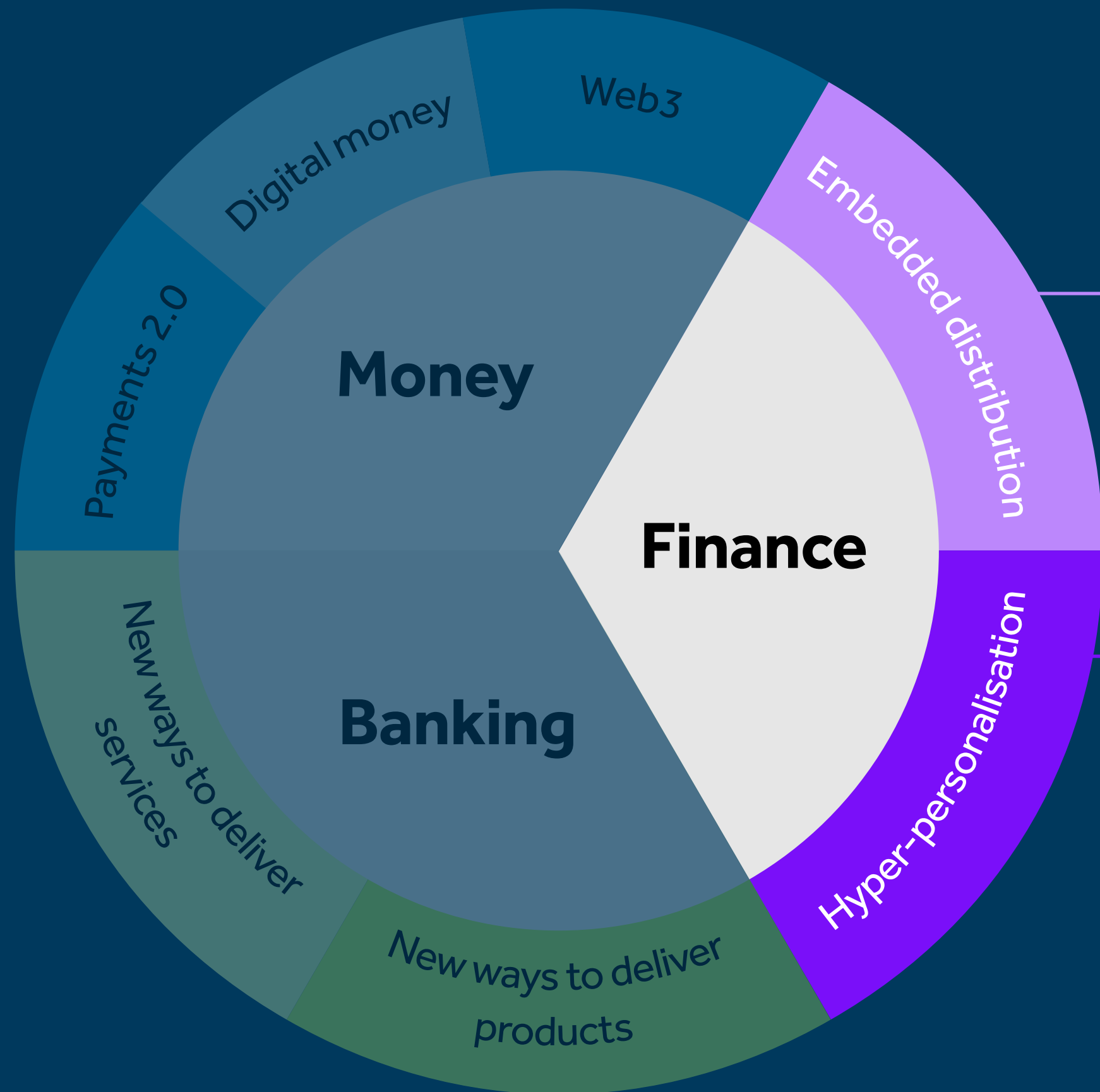
Financial products are increasingly transitioning out of one-size-fits-all standards which taps into previously underserved consumer groups and business segments that have more specific needs. Thanks to maturing technologies, large-scale data availability and new business models, they could be served at scale, with commercially viable offers and attractive unit economics. Leveraging data could enable us to improve the customer experience, contextualise it to their individual circumstances in real time and offer hyper-personalised propositions to meet their needs.

Embedded finance has seen significant activity in recent years, with some submarkets now too saturated for investment. Yet, large pockets of value remain untapped. In particular, embedded distribution will provide an exciting way to reach business customers. Industry-specific platforms can provide access to underbanked customers, right where their businesses (and data) already reside. This allows data network effects to be leveraged and financial propositions to be tailored to the specific issues of these industry verticals.

Hyper-personalisation is a tremendous opportunity for banks to adopt a better informed, data-driven, contextualised approach to products

The future of finance

Near-term > Mid-term > Long-term*



Vertical-specific platforms embedding financial products

Contextualising existing financial products

Vertical-specific new financial products

*FVS focus

Personalising customer interactions brings an extra **\$300 million** revenue growth for every \$100 billion in assets³⁶

86% of customers see personalisation as the basis of their relationship with banks³⁷

Hyper-personalisation: Customised to individuals

In recent years, fintechs have risen to prominence thanks to new products and solutions to help specific customer segments make payments, borrow money and manage their finances. They have established strong footholds in specific segments by developing digital finance solutions tailored to the needs of those segments (e.g., gig, creator, low-income) or to the changing financial context of consumers' lives.

Several technological shifts fuelled this rise:

- Democratised access to Open Banking has lowered the barrier to entry for new players
- Digitisation is fuelling alternative data sources (e.g., from geolocation, online and mobile behaviour, broader financial history and key life events) that can now be used to provide insights on previously unreachable segments (e.g., unbanked customers).
- Maturity in AI/ML, low-code, API and real-time data processing technologies means you can harness these unprecedented amounts of information to turn them into actionable insights

Hyper-personalisation is a tremendous opportunity for banks to take this a stage further and adopt a better informed, data-driven, contextualised approach to products. Behavioural recommendations, omni-channel optimisation and predictive personalisation have high revenue-generating potential. Alternative data can also be leveraged for higher accuracy risk assessments and underwriting.

Two types of opportunities show great potential in this space:

- **Contextualising existing financial products** in real time through the use of data and AI/ML to better address the constantly changing financial needs of consumers
- **Building vertical-specific financial products** to meet the unique needs of niche/diverse consumer segments, through new business models built on Open Banking and alternative data

³⁶. Boston Consulting Group (2019)

³⁷. Finextra (2022)



Sector spotlights

Democratised wealth management tailored to customers' financial context

How can we make financial planning and wealth management tools more accessible to empower more people to anticipate their future financial needs?

Digital finance products still struggle to fully capture and adapt to the changing financial needs (and data profiles) of their customers. Contextualisation could allow a comprehensive picture of a customer to be built – what their situation is now and likely to be in the future – in order to anticipate their real financial needs.

This can be particularly impactful in digital wealth management, where the invested amounts and risk-taking need to be calibrated to the ever-evolving appetite of each customer.

Wealth management startups raised

\$3.2 billion

of VC money in Q2 2022³⁸

Historically, personalised finance and wealth management was reserved to a small niche of ultra-high net worth customers, through private wealth managers.

Digital platforms, such as **Nutmeg** (\$153.6 million raised then acquired by J.P. Morgan)³⁹ and **Robinhood** (Post-IPO secondary, \$6.2 billion),⁴⁰ have now democratised access to wealth management. However, these platforms remain focused on mass audiences through blanket propositions which could make it unappealing to those with unique needs, but still looking for a digital solution.

Given the increasing power of AI/ML and use of alternative data, it stands to reason that the next phase of this evolution will welcome more personalisation, acting as algorithmically automated personal wealth managers that take into account individual financial context. An example of this is **Nalo** (Seed, \$4 million)⁴¹ an early-stage startup that enables customers to build a unique investment portfolio based on their current situation and projects (retirement income, future real estate purchase, children's education, etc), but also personal values and interests (e.g., ESG investments).

Vertical-specific products for the gig and creator economies

How can intermittent income groups access lending, insurance and pension products?

The growing number of people working in the gig and creator economies can experience difficulties with credit and rent applications, and may struggle to access solutions to address inconsistent cashflows and late invoice payments. As these segments are growing rapidly, there is greater need for solutions that address these underserved financial needs.

A few early-stage startups are emerging in this space working on solutions to give access to credit and instant financial solutions, often through a direct-to-consumer (D2C) approach.

\$455 billion

estimated market value of gig economy market in 2023⁴²

\$100 billion

and rapidly growing creator economy market in 2021⁴²

\$2 billion

investment into creator-focused startups in H1 2021 alone⁴³

Examples of these are :

StaffMe (Series A, €3.5 million)⁴⁴

A French job marketplace for freelancers, helping them receive immediate payments. They are partnering with DeFacto to offer a line of credit based on predicted future cashflows.

Karat Financial (Series A, \$45.6 million)⁴⁵

A more scaled up version aiming to create a financial infrastructure for creators. They currently offer business credit cards tailored to creators' needs but aim to develop a broader suite of products to help them launch merchandise lines, incorporate their business, get a mortgage, take out business loans and file their taxes.

We see significant room for growth within this space, with huge potential to start embedding these services directly into the platforms that gig workers and creators use to make their living.

38. Dealroom (2022)

39. Verdict (2021)

40. Fintech. (2023)

41. Early Metrics (2021)

42. J.P. Morgan (2021)

43. The Creator (2022)

44. FINSMES (2018)

45. TechCrunch (2021)

3x growth

embedded finance growth in 2021 alone⁴⁶

\$3.1 billion

embedded finance market in 2021⁴⁶

Embedded distribution: Bringing finance to your business

Embedding financial products into platforms and marketplaces will unlock new offers for businesses in underserved industries by leveraging data network effects.

Beyond personalising products to individual needs, these products must still reach their target customer at the point of need. Embedded finance seamlessly grants access to new or underserved customer segments. By leveraging existing platforms and marketplaces as distribution channels and sourcing alternative data, banks can meet the needs of an audience they could not previously serve at scale and offer the right product just when they need it.

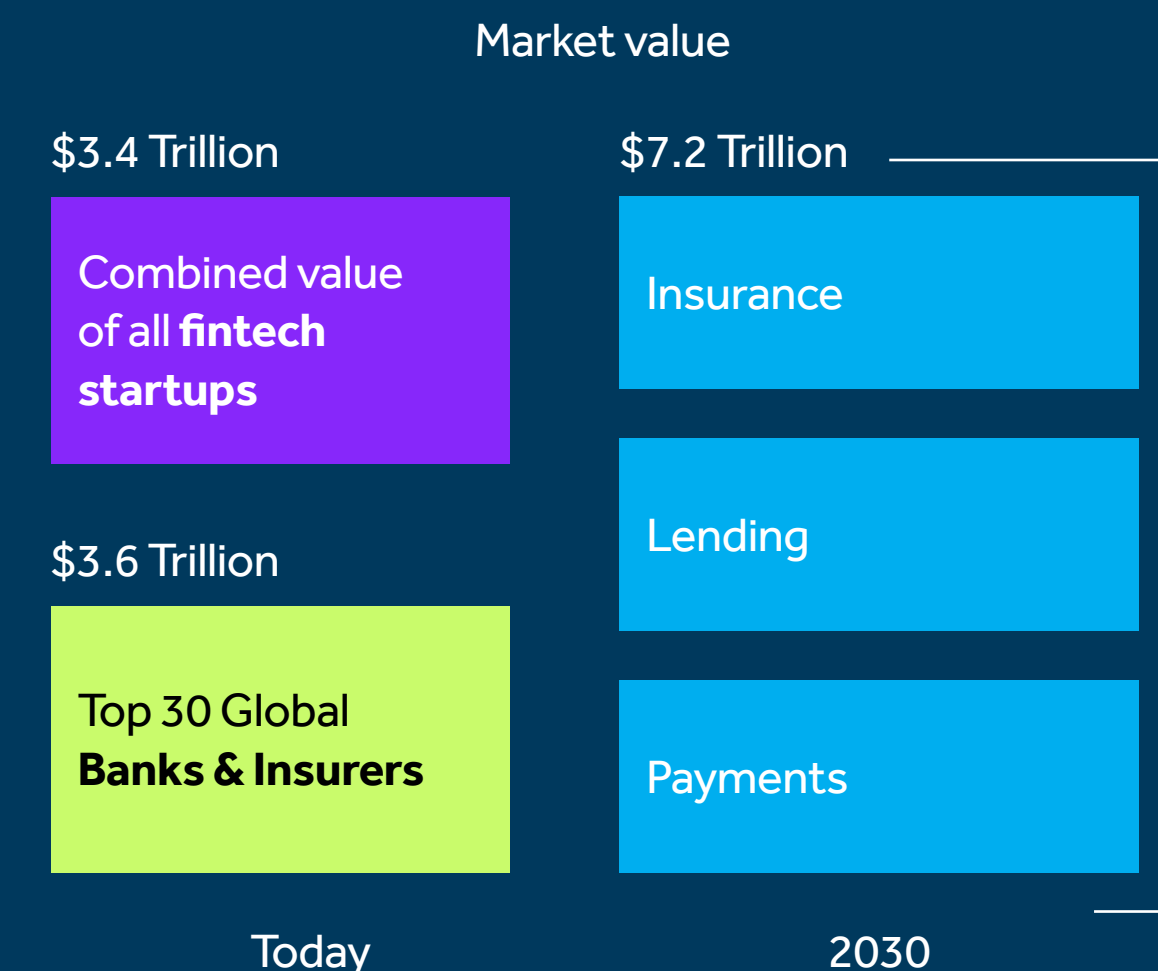
Embedded finance is not new. It has been around for half a decade and has received billions of dollars in funding. However, it is becoming increasingly apparent that it is just reaching the inflexion point, with a lot more potential ahead. Rapid adoption of mature use cases is driving growth, but a number of spaces are still emerging or maturing and have not yet been fully explored. Embedded lending revenues are predicted to grow from \$1.4 billion in 2020 to \$15.7 billion in 2025⁴⁶ as many industry verticals remain untapped. Segments such as embedded insurance or embedded wealth are still at a nascent stage and are still ripe for more innovation.

Embedded finance, combined with hyper-personalisation, will play a key role in the next wave of financial innovation. A boom in B2B applications is likely imminent, which will further increase focus on these offers to address untapped but high potential industry verticals. That said, embedded finance has tremendous potential to better support customers we have not been able to serve in the past. Barclays are particularly interested in three specific applications within embedded distribution:

- Offers to address **B2B use cases** still have room for growth across every product category
- **Vertical-specific platforms embedding financial products** will allow underbanked verticals to be served through scaled access, data and tailored propositions
- **Embedded wealth, parametric embedded insurance** and various embedded Web3 models are nascent for now, but can disrupt entire industries in the future

Embedded finance market value expected to reach \$7.2 trillion by 2030⁴⁶

Embedded finance can unlock an opportunity bigger than the current value of all fintech startups and the top global banks, combined.



46. Dealroom (2022)

Source: ABN AMRO/dealroom

Sector spotlights

B2B embedded financing and loans to access underserved businesses

How can we support businesses in underserved industries by accessing them through the platforms they use to conduct business?

A number of platforms that specialise in servicing specific industries are starting to embed financial services products into their stacks to provide their customers with access to financing. Solutions already exist to support the healthcare, agriculture, education, real estate and employment sectors.

An exciting space for embedded finance is in agriculture, which as an industry has a very unique set of risks, finances and data.

DeHaat (\$700m - \$800m valuation)⁴⁷

An Indian agritech platform⁴⁸ offering end-to-end agricultural services and products to farmers. DeHaat acquired B2B SaaS platform FarmGuide, part of the Rise India community, and integrated their spatial technology and data science into DeHaat's existing platform in order to build a full-stack platform for agribusiness. Utilising tagged land parcel data, DeHaat now offers personalised agritech services that let them check their feedstuffs and fertilisers are organic and can claim to be sustainable to their customers. DeHaat is also embedding loan products to provide financial services on the back of the data generated through the platform.

Hospitality is another space that has seen a number of emerging tech stacks which lend themselves to embedded finance use cases. A well-known example is US-based reservation platform:

Toast (December 2022 market capitalisation of \$9.16 billion)⁴⁹

Providing backend services to the restaurants, allowing them to manage their bills, invoices and receipts, as well as process payments and manage payroll. They have embedded lending products through Toast Capital to give fast and flexible small business loans to restaurants on their platform, with loan decision based on the restaurants' financial data.

⁴⁷. Techloy (2022)

⁴⁸. YourStory (2021)

⁴⁹. CB Insights (2023)



The future of banking: Harnessing technology to build the bank of the future

How will banks deliver on the future of money and the future of finance beyond money?

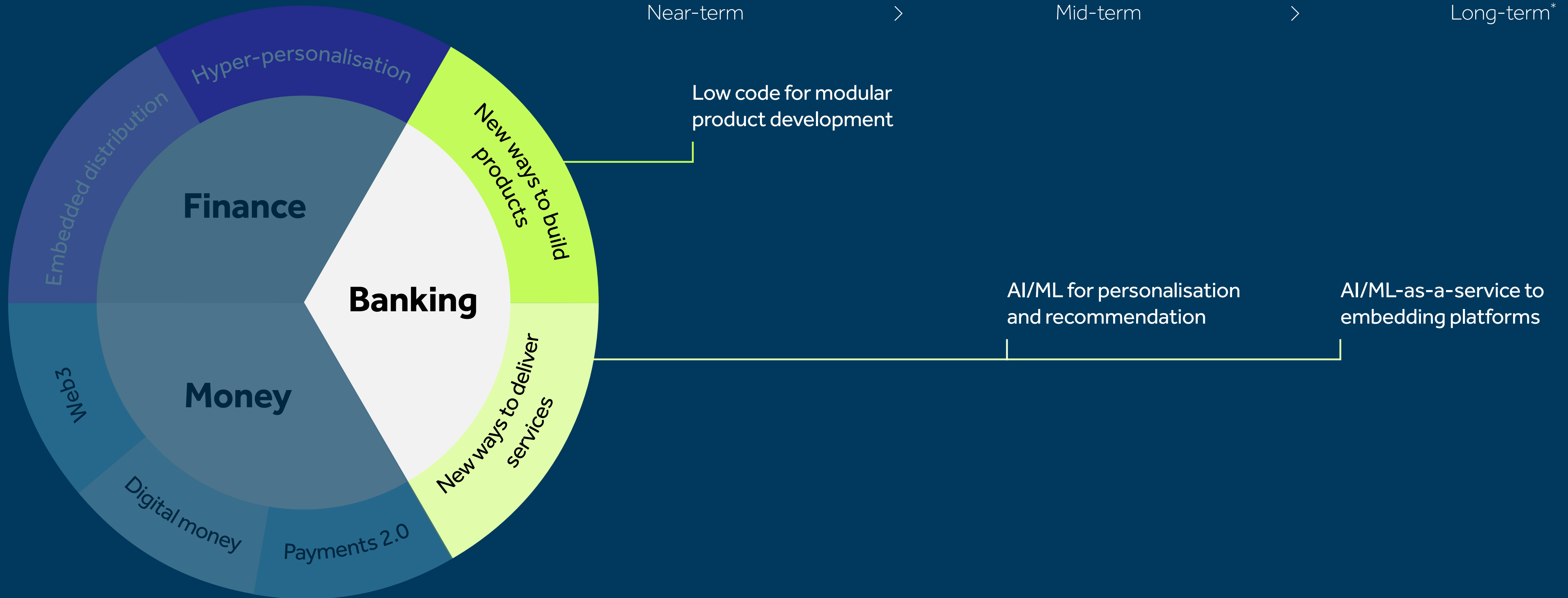
In the future, banks will boost their efficiency in distribution channels and deepen profits by creating personalised and responsive products that are contextualised and delivered either directly to customers and clients or through embedded digital experiences the customers or clients want. To deliver them, banks need to harness a number of technologies, especially around data. As the pace of innovation accelerates, they also need to develop these products faster, better and cheaper than ever before.

Going forward, technologies like low-code development and AI/ML engines will be key to the institution's journey towards faster go-to-market, more personalisation and new product innovation. We are keen to explore opportunities and solutions with fintechs that have deep expertise in these and other innovative technologies.

Technology is beginning to open up new opportunities for banks and other financial institutions to adopt more agile methods of development and launch products at pace

The future of banking

Near-term > Mid-term > Long-term*



*FVS focus

90%
faster development time with
low-code/no-code solutions⁵⁰

\$187 billion
in revenue expected to be
generated by the global
low-code/no-code market
by 2030⁵¹

65%
of application development
activity will be done through
low-code/no-code by 2024⁵¹

New ways to build products: Faster speed to market and personalisation

Adopting APIs, low code and AI/ML technologies in the banking stack will enable institutions to build and launch new digital products faster, at scale and enable personalisation.

Over the past decade, fintechs have triggered a major transformation in financial services, with some expanding into financial super apps and creating competitive pressure on banks.

Traditional financial institutions, on the other hand, face more complexity to launch new products as they navigate integration with existing legacy systems and tighter regulation. However, technology is beginning to open up new opportunities for banks and other financial institutions to adopt more agile methods of development and launch products at pace.

Due to this trend, banks will get better at building and launching personalised digital products and services at pace. Technologies such as hybrid cloud computing are already widely adopted by traditional financial institutions, facilitating faster response to client demands and lower software/hardware infrastructure costs. Integration and orchestration platforms, AI/ML and robotic process automation (RPA) all have potential to deliver significant cost savings and improved process productivity in the future. Many of these technologies are still in the early stages of adoption, with their full potential yet to be revealed.

Banks will need to build new tech stacks in order to deliver a better and more personalised experience to consumers. Though still in relatively early adoption, APIs allow banks to adopt new business models faster and experiment with new use cases at low cost. A no-code/low-code development framework allows products to be developed 10 times faster than when using traditional platforms.⁵²

All of these technologies will be critical to build the future of banking. The application of low-code technology for modular product development is most exciting, as it has some immediate impact on how banks build and launch products.

^{50.} 451 Research (2018)

^{51.} AI Multiple (2022)

^{52.} FintechOS (2022)

^{53.} Finextra (2021)

^{54.} Business Wire (2021)

^{55.} Crunchbase (2023)

Sector spotlights

Low-code

Low-code technology has the potential to radically transform how banks and financial institutions develop and launch products. Some of the biggest emerging companies in this space are:

FintechOS (Series B, \$91 million)⁵³

A global technology provider for banks and other financial services companies. They offer composable digital and core business blocks with a no-code/low-code approach, allowing institutions to modernise legacy systems and launch new digital products faster and more efficiently.

Mambu (\$5.5 billion valuation)⁵⁴

A SaaS banking platform providing flexible banking architectures. Its sustainable, composable approach allows independent engines, systems and connectors to be assembled and re-assembled in any configuration to meet business requirements and the ever-changing demands of customers.

Toqio (Series A, €28 million)⁵⁵

Enables businesses to embed financial solutions in a matter of days, removing the need to build and manage complex software in-house.

New ways to deliver services: More data-driven experiences

Better data feedback loops will power new product innovation through hyper-personalisation of products to enhance user experiences.

It is not just technology that will help deliver change at pace – data can help, too. The future of finance and money will be delivered by harnessing a very large range of open, alternative and perhaps even synthetic data. To execute on personalisation, financial institutions need to improve their ability to integrate, analyse and action this data as well as adopt the newest methodologies in AI/ML modelling. This will allow them to build holistic customer data profiles in order to offer personalised products and match the right customers with the right products at the right time and price in an anticipatory and responsive manner.

Whilst these capabilities were predominantly developed in-house in the past, a number of turnkey market solutions are emerging to help harness the power of data. For example, rapidly growing personalisation engine Software-as-a-Service solutions, which can be used to build personalised recommendations, predict customer behaviour and much more.

There is a lot of excitement surrounding opportunities that leverage AI/ ML for personalisation and recommendations combining the latest AI/ML technologies with institutions' huge volume of customer data. Such a trend will not just enable banks, for example, to fast track their personalisation journey, but also surface new use cases and further business model innovation through closer collaboration with other institutions, fintechs and embedding platforms.

\$12.9 million
The market for personalisation engine software-as-a-service by 2028⁵⁶

⁵⁶. Verified Market Research (2022)

⁵⁷. Business Wire (2021)

⁵⁸. Personetics (2022)

⁵⁹. AltFi (2022)

Sector spotlights

AI/ML for personalisation and recommendation engines

How can financial institutions leverage personalisation engines and monetise new and alternative data?

Personetics (PE, \$178 million)⁵⁷

Leverages AI to enable banks to analyse financial data in real time and understand customers' financial behaviours, anticipate their needs and deliver a hyper-personalised experience. They recently launched a new solution to analyse customer transaction data, which allows banks to show customers their carbon footprint and suggests ways to reduce emissions with greener spending choices and climate-friendly financial goals.⁵⁸

Bud (Series B, \$102 million)⁵⁹

An Open Banking fintech startup that developed an open banking platform based on transactional AI models that enable financial institutions to personalise digital products and automate lending decisions.

AI/ML-as-a-service to embed platforms

How can we best support platforms and product providers embedding and personalising financial propositions to support their customers?

As embedded finance will continue to grow and attract more types of non-financial companies, embedded platforms will increasingly need support to harness available data. Companies with strong tech capabilities have already been integrating AI/ML into their operations to enable this, but the majority of providers are not equipped to do so. This is a very exciting emerging space and FinTech Venture Studio is interested in organisations exploring AI/ML offerings as a service to embedded platforms.

Afterword: How to be a part of the future of financial services

At the FinTech Venture Studio, we are passionate about these topics and will continue to delve into the themes we have explored in this report. This is the first of many we at the FinTech Venture Studio look to publish as our Innovation Thesis constantly evolves to respond to market shifts.

If you are building innovative solutions to harness these exciting opportunities, we want to talk to you and explore how we could work together through one of our programmes. Contact us at FVS@barclays.com.

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