

Longer Term Investments

Fintech

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- Driven by rapid urbanization, strong demand from millennials and favorable regulations, we believe the global fintech industry is at an inflection point and set to drive a major digital transformation in the financial services industry.
- We expect global fintech revenues to grow from USD 120bn in 2017 to USD 265bn in 2025, implying an average annual growth rate about three times faster than the broader financial sector's.
- Fintech's solid long-term uptrend offers investors above-average growth opportunities, in our view. Investors can take part in this by investing in a diversified way in our theme of fintech companies, particularly leading payment players, platform companies and disruptors in emerging technologies like blockchain and artificial intelligence.

Our view

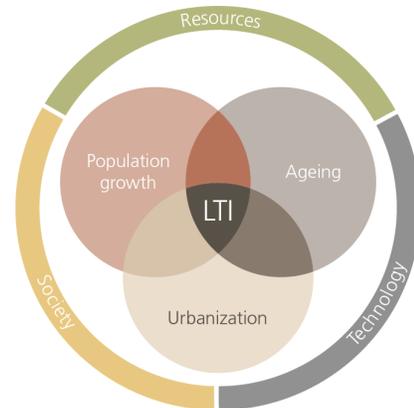
The global financial services industry is at an early stage of a major digital transformation powered by fintech, which is the confluence of financial and technology-driven innovation.

The fintech industry is at an inflection point due to both demand and supply factors. On the demand side, we believe rapid urbanization and the need for financial inclusion should drive demand for fintech services that are centered around digital areas like mobility, cloud computing, analytics, social and emerging technologies such as blockchain and artificial intelligence (AI). Stronger demand from millennials and favorable regulations are other supportive demand factors. On the supply side, the need for cost savings and the increased efficiency of fintech services are forcing incumbent financials to launch fintech services, which, coupled with strong interest from technology companies and a proven ecosystem, should increase the availability of fintech services. We expect fintech revenues to more than double from USD 120bn in 2017 to USD 265bn by 2025, implying an average annual growth rate around three times faster than the broader financial sector's revenue growth.

With double-digit earnings growth expected annually over the next eight years, we see fintech as one of the fastest-growing industries globally. Investors will be best rewarded by investing in a diversified way in our theme, in our view, with a focus on payment industry leaders, technology companies launching disruptive fintech services and incumbent financial companies with a clear fintech strategy.

Introduction to the Longer Term Investments (LTI) series

- **The Longer Term Investments (LTI)** series contains thematic investment ideas based on long term structural developments.
- Secular trends such as population growth, ageing, and increased urbanization create a variety of longer term investment opportunities.
- These investment opportunities are influenced by the interplay of technological advancement, resource scarcity, and the societal changes.
- Investors willing to invest over multiple business cycles can benefit from potential mispricings created by the typically shorter term focus of stock markets.



Companies that are able to create platforms with network effects around emerging technologies like AI, blockchain and analytics are also potential winners.

What is fintech?

The term fintech should not be confused with the usual technology spending by financial services companies on things like software, mainframes and data center expansions. Financial companies have always been known as the biggest customers of many technology firms, as technology helps them to differentiate their services in highly competitive, service-oriented industries like banking and insurance. Financial firms on average spend 6–8% of their revenues on technology although the share has been gradually declining since the 2008 global financial crisis.

Ironically, the 2008 crisis is credited in large part for the surge in fintech companies, as the focus of financials, particularly banks, shifted to comply with post-crisis regulatory developments and cost-cutting measures. This led to an innovation vacuum in the industry at a time when smartphones and corresponding disruptive forces, like e-commerce, social networking and mobile apps, were taking the world by storm. Fintech companies appeared on the scene to initially fill this void, but they later took off as standalone companies and as partnerships with banks when opportunities started to explode.

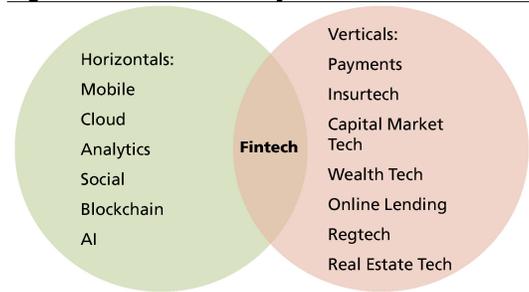
So, for the purpose of our report, **we define fintech as the confluence of financial and technological innovation that facilitates banking and financial services. Fintech, in our view, is about digitalizing finance, which takes advantage of digital services like social, mobile, cloud computing and analytics, as well as emerging technologies like blockchain and artificial intelligence (AI).** For example, we view online banking as traditional financial services IT, but consider mobile apps as fintech as they leverage smartphone technology (e.g. the superior user interface, location-based services, etc.).

While fintech covers many technologies around these digital areas and emerging technologies, in this report, we divide the industry into verticals and horizontals. Verticals are sub-industries within fintech, whereas horizontals are the key underlying technologies driving the digital transformation. For the purpose of our report, key verticals include payments, insurtech, capital markets tech, wealth tech, online lending and other areas like regtech (regulation), real estate tech, etc. Horizontals include the four major digital technologies – mobile, cloud, analytics and social – and emerging technologies like blockchain and AI.

Why fintech is at an inflection point

While technology has always been a key differentiator in the financial services industry, whether solving major computing needs through mainframes or setting up new banking channels like automated teller machines (ATMs) or online banking, the unprecedented innovation in the past few years has led to the emergence of fintech services. We believe the fintech industry is at an inflection point, as we see strong drivers on both the demand and supply sides. This trend, we believe,

Fig. 1: The fintech ecosystem



Source: UBS, as of March 2018. Note: Regtech = regulatory technology

is irreversible and will gain strong traction as the future landscape for financials is set to change considerably.

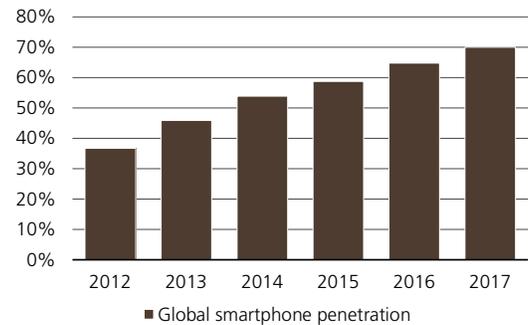
Demand drivers

Urbanization: Thanks to rapid urbanization globally, technology infrastructure has progressed swiftly over the past decade. Faster data networks like 3G/4G have extended wireless coverage greatly with the rollouts of nationwide broadband programs. This has resulted in most of us being connected to the internet around the clock (24/7). The other notable development is the rise of the app economy. The mobile app developer, a job which was virtually non-existent a decade ago, is today one of the highest-paying occupations globally. Developers have built more than two million apps on both iOS and Android operating systems, and thousands of finance apps. With an improving technology ecosystem, and due to the proliferation of low-cost devices, smartphones have become ubiquitous in societies across the world. Global smartphone penetration as a percentage of total population has almost doubled in the past five years, rising from 37% in 2012 to 70% in 2017 (see Fig. 2). With every incremental handset sold being a smartphone, we are not far away from reaching universal smartphone adoption or full smartphone penetration.

Driven by a desire to stay connected all the time and the need to efficiently multitask throughout a busy day, most of us in today's urban world have become "digital omnivores" and see smart devices as a prime necessity rather than a luxury. As a result, our banking and financial transactions have increasingly shifted to mobile or social driven alongside the increasing trend of consumerization. There is therefore rising demand for fintech services: payments are increasingly being made through mobile phones; people are turning to social channels like crowd-funding for their financing needs; and investment advice is increasingly being based on big data analytics. The trend is even more apparent in emerging markets like China, which leapfrogged to a "mobile first" economy. According to a UBS Evidence Lab study in August 2017, the combined use of mobile wallets like Alipay and WeChat Pay has surpassed cash across key cities in China. Hence, we believe the urbanization trend will drive strong demand for fintech services in the years to come.

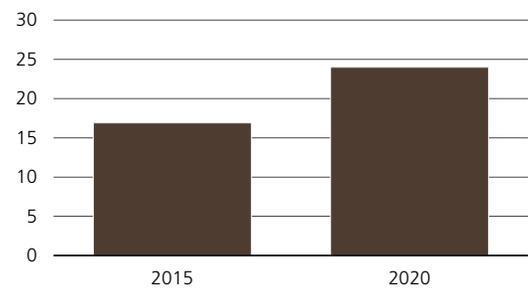
Strong demand from millennials: The financial, economic and sociopolitical prominence of the millennial generation, those born between 1982 and 1998, is continuing to grow at a rapid pace. Accounting for 27% of the global population, they held USD 16.9trn of the world's private wealth in 2015 (see Fig. 3); and by 2020, that could rise as high as USD 24trn – or roughly 1.5 times the US's national output in 2015. In our report, "Millennials – the global guardians of capital," published in June 2017, we identified, among others, two unique characteristics of millennials: First, millennials are digital natives, which means their high fluency with technology should drive increasing demand for digital services. Second, millennials call for a wide choice of content, conveniently delivered, that meets their varied affinities and needs. We believe these two characteristics make fintech services a natural fit for millennials. This group, which takes full advantage of digital technologies around social and mobile, should

Fig. 2: Global smartphone penetration is rising



Source: UBS, as of March 2018

Fig. 3: Millennials – the global guardians of capital
Global private wealth of millennials (USD trn)



Source: UBS, as of June 2017

find fintech's unique features particularly appealing, such as the better user interfaces, integration with other financial apps/platforms and personalization.

A UBS Evidence Lab study in November 2017 highlighting the growing demand for fintech services from millennials found that they, on average, make 2.26 financial transactions per week on their smartphones, versus 0.83 through a bank branch (see Fig. 4). With millennials set to control an even greater share of global wealth in the future, as they are positioned to benefit from one of the largest inter-generational wealth transfers in history, their affinity toward fintech services should be a strong growth driver of the industry.

Favorable regulation: In addition to strong demand from consumers, regulators across the world are in support of fintech services. From a regulator's point of view, they bring much-needed competition to incumbent banks and financial companies, which should result in better pricing and incremental innovation.

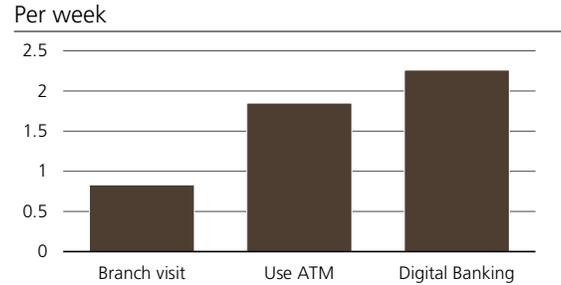
Not many people in emerging markets have a bank account, according to the World Bank (see Fig. 5). But thanks to the success of mobile technologies like the M-pesa payment system, which reached 80% of households in Kenya within four years, many governments and regulators across the world realize that the disruptive and attractive pricing nature of fintech services facilitates financial inclusion.

To drive financial inclusion by using digital technologies, the G20 Financial Inclusion Action Plan (FIAP) 2010 laid out a few principles. This has resulted in regulators becoming facilitators. The goals of the G20 FIAP include providing an enabling and proportionate legal and regulatory framework for digital financial inclusion, expanding the digital financial services infrastructure ecosystem, and strengthening digital and financial literacy and awareness. Most regulators today also promote fintech innovation through the concept of sandboxes. A sandbox is an entity endorsed by regulators that allows temporary, limited-scale testing of a new product that may temporarily relax a regulatory requirement. The aim is to assess the potential benefits and risks of a new product by easing its launch. Other demand drivers, from a regulatory perspective, for fintech include favorable (i.e. light) regulations for promising innovations, providing capital to upcoming fintech start-ups and cross-regional cooperation in promoting fintech.

Supply drivers

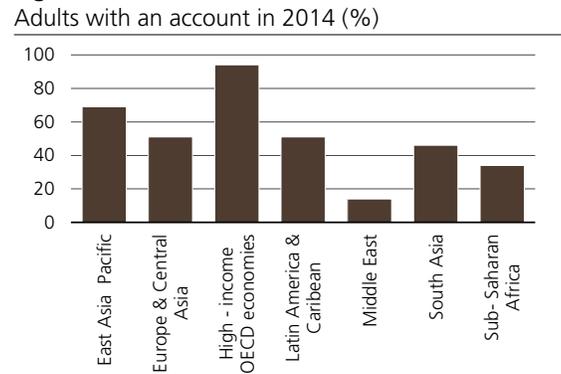
Strong interest from technology companies: Thanks to forces like smartphones, e-commerce and social networking, tech companies have been able to disrupt many traditional sectors and industries. Fintech, as such, allows technology companies to disrupt financial services, which, according to Bloomberg, generates annual revenues of around USD 5trn. The strong interest from tech companies, both small and big, is facilitating innovation and in the process causing the disintermediation of many traditional financial services like payments, insurance, real estate and lending.

Fig. 4: How millennials bank in Indonesia



Source: UBS Evidence Lab, as of November 2017. Note: ATM = automated teller machine

Fig. 5: The need for financial inclusion



Source: World Bank, UBS, as of March 2018

As a result, with tech companies only scratching the surface, we see significant disruption opportunities in the financial services sector through fintech thanks to continuing interest from tech companies. Fintech companies have been attracting significant financing, receiving a cumulative investment of around USD 60bn in the past five years, with Asia contributing one-third.

Against this backdrop, we expect strong investment and innovation in the fintech industry from tech companies over the next few years.

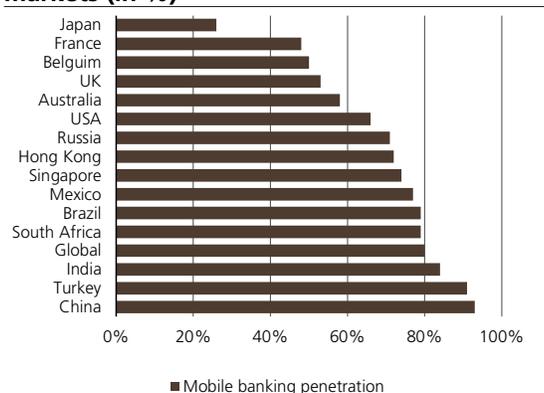
Strong interest from incumbent financial companies: With the threat of disintermediation from fintech rising, incumbents know that the trend is irreversible and it is time to embrace innovation. As the popular saying goes, if you can't beat them, join them, and many traditional financial companies have realized the benefits of fintech which if leveraged with their existing loyal customer base and extensive distribution networks can help not only reduce costs but also maximize revenues through new products and services. A UBS Evidence Lab study in 2016 predicted that fintech can improve the cost-income ratio of global banks by 180bps (from an expected 49.6% in 2016 to 47.8% in 2019).

Many banks today have innovation labs to promote fintech and have also adopted a partnership approach with the startups, leveraging each other's strengths. In addition to developing in-house fintech solutions, with many financial companies either investing or nurturing standalone fintech companies, there will be no dearth of fintech offerings from incumbent companies in the future. The initial results are impressive, with the penetration of mobile banking increasing across key markets (see Fig. 6) , according to a UBS Evidence Lab study in September 2017.

A well-established ecosystem: The fintech industry is well past its peak in the hype cycle as we believe the ecosystem is now well-established, with clear monetization strategies and growth visibility. With multiple stakeholders across technology, financing and regulation keen on supporting the fintech trend, we believe growth in the industry is more sustainable as we believe there are more companies now than in the past with proven business models and monetization in many areas. While the industry initially suffered from severe talent shortages, continuous investments in skill development programs across the globe have narrowed the gaps. Finally, as we discuss in the next few sections, with strong growth expected in the coming years, the industry is in a sweet spot in terms of key supply factors like capital, talent and innovation.

Against the backdrop of strong demand and supply drivers, we believe the global fintech industry is at an inflection point, with industry adoption expected to take off. With likely more fintech public listings expected in the next 12-18 months, we believe fintech as a trend should gain more investor traction.

Fig. 6: Mobile banking penetration across key markets (in %)



Source: UBS Evidence Lab, as of September 2017

How fintech is helping incumbent financials - A case study

As highlighted earlier, many traditional banks today fully embrace fintech. While we believe fintech contribution continues to rise for many of these incumbent companies, in our case study, we highlight an Asian bank, DBS which is fully taking advantage of fintech and digitally transforming.

In November, 2017, DBS held its Digital Transformation Investor Day articulating its digital strategy. As management highlighted the company has been able to successfully transform itself from "damn, bloody, slow" to one of the global digital leaders by fully leveraging key digital technologies like mobile, cloud, social and analytics and in the process significantly improve its efficiency. For instance, DBS highlights that as part of its digital transformation, the company had only 11.2% of its applications in the traditional data centers in 2017 compared to 90.3% in 2014 as the company has been able to successfully transition into its optimized cloud. The following data shows how digital today plays an important role on its financials and performance.

The rising digital influence on incumbents

How digital plays a vital role at DBS

Superior returns from Digital segment

2017 profit and loss (SGD bn)			
	Total	Traditional	Digital
Customers (m)	5.9	3.6	2.3
Income	5.1	2	3.1
Costs	2.2	1.1	1.1
Profit before allowances	2.9	0.9	2
Key indicators			
Income per customer (SGD '000)	0.9	0.6	1.3
Cost-income ratio	43%	55%	34%
Return on equity	24%	19%	27%

Source: DBS, UBS

How big is the fintech market?

Today, clear industry projections on fintech are missing. We believe a few industry observers have significantly underestimated the opportunities by accounting for the revenues of only unlisted companies or by including every technology spending at financial companies.

Based on our calculations, the combined fintech revenues for all the fintech companies we monitor stand at USD 120bn, or low-single digits as a percentage of global financial revenues, which we believe is plausible as fintech today accounts for 0-5% of the global financial sector's revenues. We expect the industry size to reach USD 265bn in 2025 (see Fig. 7), implying fintech as a percentage of overall financial revenues will reach mid-single digits, which we believe is reasonable. In summary, we expect the fintech industry to report an average annual growth rate of 10.5% or 3x the broader financial services sector during 2017-25. Our estimates may prove to be conservative if fintech adoption is stronger than expected in emerging markets.

In the next few sections, we highlight the key growth segments of fintech.

Payments

Fintech is transforming clearing, settlement and point-of-sale payments

The payments landscape has been transformed by the application of technology both behind the scenes (clearing and settlement) and at the point of sale (POS). Technology is impacting the payments ecosystem in profound ways and capturing ever greater volumes of payment flows for both banks and non-banks alike. Fintech players span a broad spectrum, and include card networks, merchant acquirers, POS players, digital payment platforms, person-to-person companies, bill payment companies and money transfer companies.

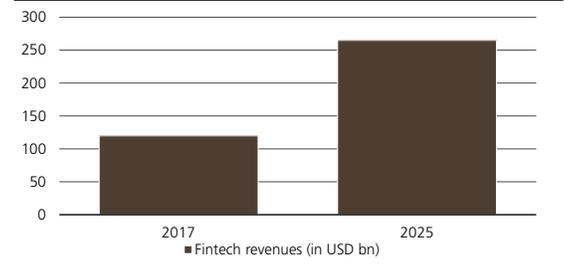
The application of fintech to payments, clearing and settlement is lowering barriers to entry and elevating the role of data as a valuable commodity. Traditional security and customer relationships still matter; however, the value of long-term reliability and trust is increasingly surpassed by ease of access, speed and accuracy. While it will likely take several years to sort out the winners and the losers, it is becoming clear that incumbent payment service providers will have to modernize and digitize to keep pace with technological changes and customer expectations.

One fintech transformation that is already widely visible is in credit card transactions where issuers, networks and merchant acquirers are leveraging digitization to enhance convenience and efficiencies across their product offerings. Other applications that have been less evident so far are in real-time payments (RTPs), where the likely earliest and largest use-case will be in business-to-business (B2B) and will eventually spread to business-to-consumer (B2C), and person-to-person (P2P) (see Fig. 8).

The trend that some refer to as "Amazon-ification" of commerce has attracted a lot of market attention, but Amazon-related e-commerce represents only a small fraction of the overall online payment market. In fact, consumer transactions executed online span broad

Fig. 7: Fintech revenues expected to post CAGR of 10.5% during 2017-25

Figures in USD bn



Source: UBS estimates, as of March 2018

Fig. 8: New opportunities for digital payments

P2P	<ul style="list-style-type: none"> Increasingly shifting to electronic and mobile payment models Deliver real-time, seamless experiences
G2C	<ul style="list-style-type: none"> Prevents misuse of funds, expands financial access, serves as effective disaster relief instrument
B2C	<ul style="list-style-type: none"> Real-time disbursements of funds, especially powerful for the "gig economy"
B2B	<ul style="list-style-type: none"> Still largely based on check and ACH / EFT Multinationals seeking cross-boarder solutions

Source: Visa, UBS, as of March 2018

Note: P2P- Person to person; G2C- Government to consumer; B2C- Business to consumer; B2B- Business to business; ACH- Automated Clearing House; EFT- Electronic funds transfer

categories in addition to pure online retail, including omni-channel retail and specialized online retail. Moreover, commercial payments can be divided among commercial cards (P-card, Fleet card, and T&E [travel and expenses] card), other points of interaction (checks and cash) and accounts payable (automated clearing house [ACH] and checks).

All of these consumer and commercial addressable markets represent an enormous volume of payment flows that could one day be captured by fintech offerings. By Mastercard's estimation, the total market size of consumer and commercial payment flow is USD 225 trillion (see Fig. 9), including cards (10%); the ACH, a network used to clear electronic payments or money transfers (51%); and cash and checks (39%). The application of technology by all market participants aims to capture a growing share of the as yet untapped 90% of payment flows that still ride on slower rails.

Technological trends are accelerating payment volumes

Cards over cash. The shift toward card-based payments instead of cash and checks is accelerating due to the growing adoption of electronic payments. The secular trend of cash-to-card conversion has been a key driver for legacy rails including Visa, Mastercard, American Express and Discover for decades. While this trend has mainly influenced credit and debit card-based payments to-date, other areas of banking are increasingly impacted by the shift to digital, including branch-banking, treasury (custody, clearing and settlement) and other corporate banking services.

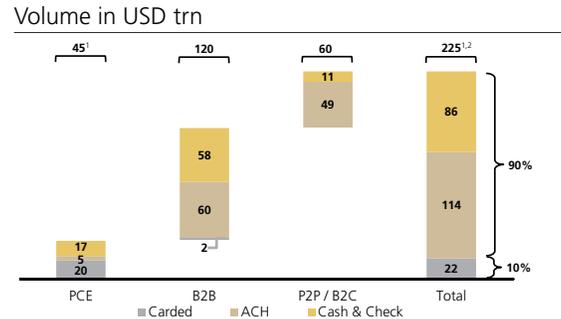
Re-imagining the branch. The utility of the traditional brick-and-mortar bank branch is changing from transaction-based to sales-and-advice-based. This means branches will not only shrink in number but they will likely also become smaller, more digitized and efficient. They will also play an ever smaller role in cash processing with lower teller and ATM costs and greater security. Branch evolution may be further impacted by blockchain (distributed ledger) technology, which is increasingly disrupting banks' traditional function in the clearing and settlement of financial transactions.

Omni-channel takes off. Travel booking was an early adopter of the online channel with the introduction of Priceline and Expedia in the late 1990s. Recognizing the ease of use and efficiency of online booking, airlines, hotels and other travel-related providers have embraced the internet channel (Delta.com, Hilton.com). Amazon and other retailers have also caught on, as more and more established brands drive increasing volumes online (Walmart.com).

Penetrating new markets. Consumer bill payment is another sizeable market that is growing exponentially as adoption increases. Regular payments such as utilities, insurance and mortgages are increasingly moving to the online channel. Consumers' comfort with banking online or with smartphones and institutional acceptance of digital payments should get an even bigger boost from the launch of real-time payments in the US and Europe later this year.

Expanding beyond just retail. The growing convenience of digital and mobile payments in business-to-consumer (B2C), business-to-

Fig. 9. Market size, by payment flow



Notes: Figures may not add up due to rounding. ¹Includes about USD 4trn non-purchased personal consumption. ²Includes non-PCE card spending.

Source: Mastercard company presentation, Oxford Economics, Euromonitor International, Kaiser Associates, McKinsey Payment, UBS, as of 2016

business (B2B) and person-to-person (P2P) transactions continues to drive adoption and growth. Payment volume growth is spurred on by in-person-to-online purchase conversion, the proliferation of low-cost acceptance infrastructure and the increased usage of prepaid and commercial cards. In B2B payments, the main driver of digital adoption of accounts payable will likely be the widening availability of a fast ACH.

Real-time is a reality. Real-time payments and a fast ACH should be catalysts for acceleration of digital payments. Real-time payments will become a reality this year in the US with the planned launch of The Clearing House (TCH), including real-time messaging, real-time settlement, and 24/7 processing. This new, fast and safe technology will likely be quickly adopted by a variety of financial services companies seeking to improve payment-related offerings to business customers.

Internet of payments. Thanks to the growing appeal of convenient online and other forms of digitized shopping, the use of technology in payments is continually evolving. Emerging trends involve the use of artificial intelligence (AI) and internet of things (IoT)-based payments. The IoT has increasingly become a part of everyday life with the advent of the Amazon Echo and other in-home devices that have spurred home appliance companies, car manufacturers, and payment service providers to explore ways to integrate into the IoT mix going forward.

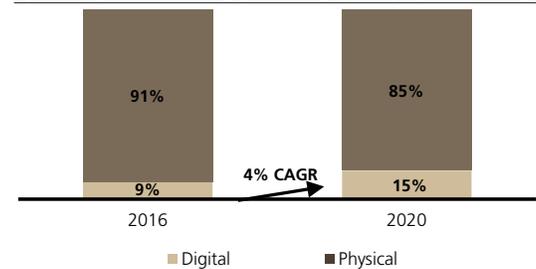
Disruptors are good... New entrants have generally been good for incumbent networks, relying on existing rails for secure, frictionless execution. The so-called disruptors, including Apple, Google, Amazon and Square, are actually positive for existing networks as they have generally partnered with incumbents and help drive cash-to-card and offline-to-online conversions. These newer players also help force traditional players to invest in enhancements to keep pace with expanding technical requirements.

...but still pose challenges. Incumbent payment companies are still facing threats of disruption to their traditional business from new entrants (telcos, startups and digital providers). Increasingly, the threats of new entrants are coming from social media and emerging market players that have the ability to tap into previously untapped products and markets. The growing disruptive threat of the future is therefore not from a new attack on existing client bases where incumbents still have scale, but rather disintermediation of the sizeable future market opportunity.

Legacy rails still matter. Several mobile wallets like Apple Pay, Samsung Pay, Google Wallet, MCX and Android Pay compete for in-person payments. These "in-app" wallets address the lion's share of in-person-mobile payment volume today, but they all still depend on the rails provided by Visa and Mastercard and their issuing bank partners as the primary funding source. Meanwhile, online checkout via PayPal Express, Visa Checkout, Masterpass and Chase QuickPay all benefit from legacy relationships/brands.

Security is key. Security remains a significant challenge for the payment industry and must be at the forefront of any new and/or updated solutions. For example, in-store and online POS transac-

Fig. 10: Total global retail spending
Spending is increasingly shifting from physical to digital



Notes: Total global retail spending excludes travel and event ticket sales

Source: Visa, UBS, eMarketer, as of March 2018

tions that used to rely on a simple signature or magnetic strip have been replaced by EMV-chips and tokenization for authentication. The emerging challenge is to ensure protection of data from cyber-security threats across POS as well as all new devices and channels.

Other services are emerging. Participants across the payment food chain increasingly demand additional services beyond simple fulfillment. Adjacent services include funding flexibility, consulting, data analytics and loyalty solutions. For example, digital wallets are generally reloadable using multiple channels (ACH, cards, Zelle and Venmo) and can help consumers manage funding methods. Thus, banks are increasingly required to offer these digital payment capabilities as part of their basic account offerings.

Insurtech

Just like fintech, we also regard insurtech as the confluence of financial and technological innovation that facilitates how insurers do business.

The insurance industry has the potential to be materially changed by new technology. And we think insurtech will drive greater divergence in earnings growth and profitability in the industry. A host of different technologies, such as AI, machine learning, Internet of Things (IoT) or blockchain, can help modernize the entire value chain and even the business model. This results in a myriad of benefits, more accurate risk assessment and pricing, more personalized solutions, more efficient operations and processes, and, most importantly, an improved customer experience and greater satisfaction. In some areas, revenue potential should be enhanced and cost savings for the industry can be significant. Insurers can benefit from new product introductions, improved operational efficiency, fraud prevention and more targeted marketing and cross-selling.

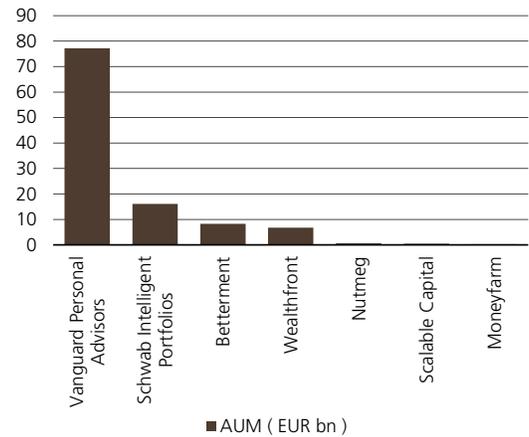
Wealthtech

The wealth management business is theoretically one of the easiest financial services that can be disrupted by fintech companies as it is a capital light business. This means banks have a significant advantage in more capital intense products and services (i.e. corporate and commercial lending).

However, we do not expect fintech innovation to significantly disrupt the wealth management business, particularly with regard to the offerings to ultra high net worth individuals (UHNWIs). This is because UHNWIs generally have sophisticated needs and therefore prefer personal interaction with relationship managers. Conversely, disruption has been noticeable in the mass market segment and with the millennials, mainly through robo-advising, where we think that fintech offerings will continue to gain market share.

However, it will be a very gradual process. In fact, several fintech companies just offer a cheaper but similar service compared to the more established companies, leaving the price as the major differentiating factor. We think that such business models will take a long time before making noticeable market share gains; this gives time to the incumbents to optimize their costs in order to provide a similar competitive offer. Robo-advising is the main fintech proposition to enable com-

Fig. 11: Assets under management of major robo-advisers (in EUR bn)



Source: Barclays, UBS, as of March 2018

petition in the wealth management business (for e.g. Nutmeg in the UK). We think it will not be a game changer, but will enhance competition in the form of reduced margins over time for the incumbent companies. The prices of robo-advisor-based companies can be up to 75% lower than the ones of traditional asset managers; this partially explains the constant price pressure affecting the industry, which is also confronted with extremely low interest rates.

Currently, robo-advising has an almost negligible market share in the industry, well below 1%, while investment houses (BoAML, Barclays) think that it may achieve a low-single-digit percentage market share in the coming years. This "optically" limited market share target can be explained by the very high fragmentation of the wealth management industry.

The ongoing reduction of bank branches in Europe (for e.g., Nordic and Dutch banks have cut their branches by roughly 50% from peak levels over the last 5-7 years) will probably favor fintech companies in the sense that banks will have fewer physical human interaction capabilities with their clients, somehow equalizing the service with the fintech offering in the geographical area. However, branch networks are still growing in Asia, where the bulk of the net new money is achieved, favoring traditional bank services in the region and consequentially in a global context.

Looking at the differentiation among existing traditional players, we notice that all the major banks are heavily investing in digital technologies and we think that any cost savings will then be transferred to clients through lower prices, therefore diminishing the difference among competitors even further. Only early adopters will benefit initially from savings related to digital technologies.

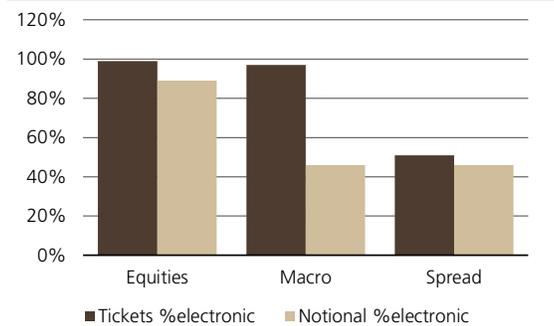
To conclude, we do not see fintech applied to the wealth management industry as a game changer; but some disruption is visible in the mass market sub-sector, which has standard needs and is the most sensitive to pricing, and in the millennials category.

Capital markets tech

Fintech or digital penetration in the capital markets industry is still in its infancy. However, in related areas, online penetration today is promising and the seeds are potentially being sown for digital technologies like mobile or emerging technologies like AI. These include 1) online platforms where clients can directly execute trades of securities and investment funds in the market; 2) algorithm trading; and 3) crowd-funding platforms.

Online trading platforms are becoming increasingly relevant, particularly for private individuals interested in execution-only services at low prices. As we believe the majority of investors value advice highly, the main consequence we foresee from the diffusion of the online trading platforms is increasing pressure on trading fees in favor of clients; but online trading platforms are unlikely to attract professional investors, at least with their current offerings. Given the trend is mainly driven by consumers, we consider the area as a low-hanging fruit for mobile technologies within fintech.

Fig. 12: Investment bank trading that is already electronic at leading banks (e.g. JP Morgan, in %)



Source: JP Morgan, Barclays, UBS, as of March 2018

Meanwhile, equity markets are already predominantly electronic, with a high percentage of transactions executed automatically (see Fig. 12). Trading is considered automated when machines decide, based on algorithms, whether to buy or to sell securities. Investment grade bonds are probably the area with the lowest fully electronic execution (roughly 20% of the total) as the agreement is mainly made over the phone, but things are changing and even this segment is moving toward full electronic trading. Of all the markets, automation is highest in the currency market; in some cases, more than 80% of FX trades are automated (source: Bank of America, Haynes & Roberts, 2017).

The push toward automation also came from regulators after scandals (such as the Libor one) showed how human-executed trades could have been manipulated by fraudulent bank employees. Electronic trading is hardly influenced by fraudulent wrongdoing and therefore guarantees a higher ethical standard.

The market consequences of these trends are a structural decline in commissions and fees, which favor clients, and frequent periods of high volatility generated by high-frequency automated trading based on algorithms. The relatively high share of algorithm-based trading in the equity markets could be one of the reasons for the recent sudden resurgence of volatility. In fact, many algorithmic strategies focus on momentum and volatility. In particular, they tend to increase market exposure with low volatility, or falling volatility, and vice versa. Because of their large presence in the market however, they can become procyclical and somewhat a driver of the market with their behavior. At times of confined volatility, they would increase market exposure but, in doing so, they would also further compress volatility. Conversely, rising volatility could trigger a domino effect, with many algorithmic strategies selling, and therefore putting more pressure on equities. We still view high frequency algorithm-based trading as part of legacy technologies; but thanks to significant progress in AI, we are not far away from AI bots taking control of electronic trading.

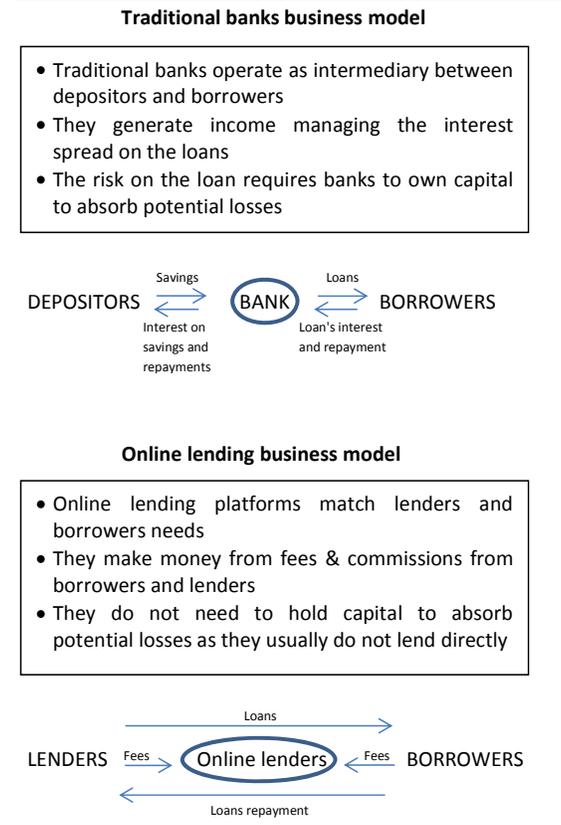
Crowd-funding platforms today fit into the definition of fintech as they provide support for small/medium capital raisings that are usually below venture capital sizes. While industry prospects are improving, by just leveraging on technological improvement, we think these platforms can compete with banks across every transaction - for e.g. medium-sized deals and in the profitable IPO (initial public offer) segment - where the banks operate. Therefore, we see them only competing with banks for small and typically risky loans as in the case of start-up companies. In sum, we do not think they will present a major threat to banks' market share in the lending and IPO businesses.

Online lending

By the term "online lending", we refer to lenders which utilize online platforms to match the needs of borrowers and lenders usually more efficiently than traditional banks (see Fig. 13). The advantage for borrowers is to benefit from lower rates on loans than otherwise applied by traditional banks, while lenders benefit from higher returns than what they would have achieved with traditional investments at the

Fig. 13: Traditional banks vs. online lending business model

Traditional banks derive revenues mainly from interest and take credit risk, while online platforms derive revenues from fees and do not share credit risk



Source: UBS, as of March 2018

same risk level. There are many platforms in the US, China, the UK and other major markets.

Some more mature platforms have also started to provide loans directly, taking direct credit risk, though this is not the bulk of the business (which is based on fees collected from the involved parties). Online lending currently generally accounts for less than 1% of total bank lending in the countries where the platforms operate, except in China where the online lending market share is already above 5% of bank loans, leaving ample room for further growth across the globe (see Fig. 14).

The size of the target market, theoretically equal to all the banks' lending, would allow very fast growth rates for several years to come. However, we believe several barriers, ranging from capital requirements to credit-risk expertise, will limit the success. We see problems arising during periods of economic recessions, when traditional banking, which depends on expertise on credit risk and lending criteria, might make a huge difference on the quality of the loans provided. Given the platforms are relatively new, their ability to lend has not been tested during periods of very difficult economic conditions.

Similarly, we do not see online lending platforms being able to take significant market shares in the corporate business, where the need for ad-hoc credit expertise is high in order to keep the lending business profitable. Conversely, disruption may take place in the consumer credit (usually with above-average risk borrowers, where current platforms mainly operate) and mortgage businesses, where standard lending procedures may be successful and they will allow gains in market shares.

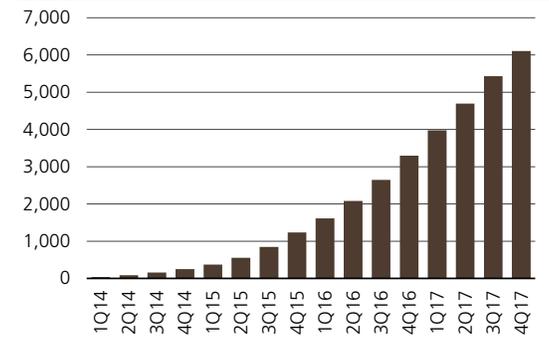
Given that economies of scale and trust among customers are key in banking, we envisage few successful platforms in the respective markets being able to remain profitable across the economic cycles and to provide good cash dividends.

While we expect online platforms to continue to gain market shares, mainly in niche segments as described above, their growth ambitions might face a less favorable economic environment going forward. In the last decade, online platforms benefited from the synchronized decline in global interest rates, which has significantly boosted credit quality, while simultaneously investors' risk appetite had to increase in order to achieve noticeable returns. We do not know if such a benign environment will continue in the future and online platforms will be equally successful in attracting investors. Ultimately, market platforms will have the option to refer to banks or other institutional investors for their funding needs, which would likely reduce profitability but it would allow growth to continue.

Other fintech verticals

With most traditional financial areas set for disruption, digital technologies could be implemented across industries and functions, such as real estate, compliance or regulations, and remittances. The other types of fintech, like regtech (regulation) and verticals based on digital technologies should help financials understand and comply with regulations.

Fig. 14: China's P2P finance cumulative lending
 Figures in CNY bn



Source: Citibank, UBS

Digital technologies can help automate mundane compliance requirements, such as monitoring for fraud, by leveraging big data analytics, for example, to correlate and analyze employee behaviors. According to CB Insights, regtech start-ups have sealed 585 deals worth more than USD 5bn in financing over the last five years. Real estate and remittance tech are other promising development areas that should significantly disrupt their respective fields in the next few years, in our view.

Driving the progress of these key fintech verticals are two major horizontal markets – emerging technologies like blockchain and AI; we believe they will provide both opportunities and threats to existing financial companies.

Blockchain

Blockchain is a secured ledger shared by all the parties in a distributed network, which records and stores transactions in an irrevocable manner. Blockchain, the core technology behind cryptocurrencies, is a foundational technology that is set to transform many industries in the future, in our view.

In an industry that relies on intermediaries to conduct transactions, the distributed nature of blockchain could be seen as a major threat to financials. But it also has the potential to yield significant cost savings for incumbents and could be a key transformative technology for financials. Four out of five banks will have adopted blockchain technology in some form by the end of this year, according to the World Economic Forum. Based on our cryptocurrency report published in October 2017, we expect blockchain to generate annual economic value worth USD 300–400bn globally by 2027 across six major industries, led by financials (see Fig. 15).

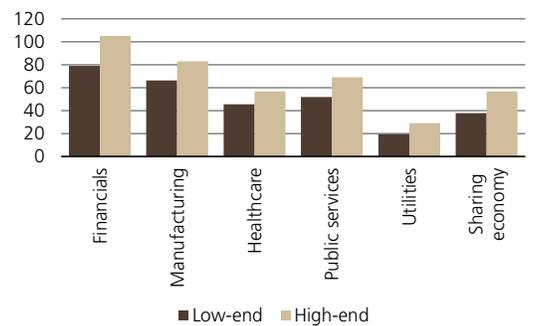
We have identified six areas where blockchain can create a significant impact in the financial industry.

Post-trade services: While typical stock exchange transactions happen in real time, post-trade services like settlement, custody, stock lending and collateral management may take days. Blockchain can help reduce reconciliation and other operational risks. The DTCC (Depository Trust and Clearing Corporation), a central bookkeeper for trades in New York that processes almost USD 1.6 quadrillion worth of trades annually, is currently rolling out blockchain solutions for its post-trade services.

Compliance: Blockchain can significantly improve the current know-your-client (KYC) and compliance processes across banks by creating digital identities for clients that are inter-operable across multiple platforms and institutions. The process would also allow clients to control this information and keep track of authorizations.

Trade finance: Blockchain can greatly enhance trade finance services currently offered by banks by leveraging smart contracts, which can automatically trigger contingent payments. This would help free up capital and boost efficiency, particularly among small businesses and in emerging markets, where the bulk of transactions are still done on paper. Even today, in China, almost three-quarters of trade or bill financing transactions are carried out on paper-based platforms.

Fig. 15: Blockchain could generate an annual economic value of USD 300–400bn globally by 2027
Figures in USD bn



Source: World bank, Bloomberg, UBS estimates, as of October 2017

Fig. 16: Blockchain should disrupt many traditional functions of financial services sector



Source: UBS, as of March 2018. Note: FX = foreign exchange

Foreign exchange (FX) transfers: In early 2018, the Bank of Tokyo-Mitsubishi UFJ teamed up with six major banks from the US, Europe and Australia to start cross-border remittance services using blockchain. In doing so, blockchain could help improve remittance speeds and reduce transaction costs, relative to current processes.

Insurance claims: A major bottleneck in the insurance industry is the claims management process, where often there are disputes between customers and insurers, and between insurers and reinsurers. Blockchain technology can solve the problem by time stamping and auditing insurance documents, and by embedding smart contracts that could automate payments once a payment-triggering event occurs.

Digital currencies: Blockchain technology can be used to improve the inter-bank settlement system for existing mainstream currencies. Early last year, a few global banks decided to join a group to create a digital cash system that would make payments via a ledger-based technology, known as the utility settlement coin.

Artificial intelligence

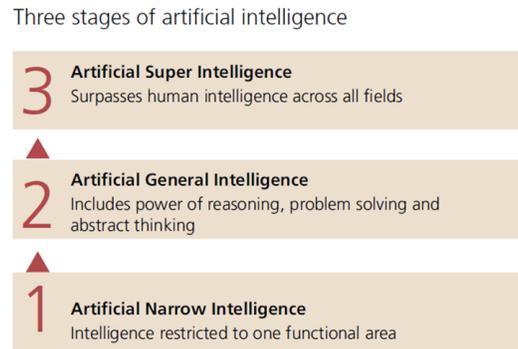
Artificial intelligence is a set of tools and programs that make software "smarter" in a way an outside observer thinks the output is generated by a human. In essence, one can perceive AI, at least in its current form, to be like a human brain with functions like common-sense reasoning, forming an opinion or social behavior. AI, however, is an umbrella term used to cover a confluence of multiple technologies such as machine learning (which includes deep learning), cognitive computing, natural language processing, neural networks, etc. AI offers significant cost savings to financial companies through high scalability, the elimination of both omission and commission errors, and the ability to instantaneously document and optimize processes.

The low-hanging fruit for AI within financial services is to leverage virtual assistants, chatbots or speech recognition software for regular customer interactions, thereby lowering the dependence on traditional banking channels like branches. Additionally, banks should get a major boost in risk management, which is traditionally an area of challenge, as AI can help manage credit-risk assessments and anti-money laundering programs better. In the longer term, as robo-advisers become more sophisticated, banks can further utilize the technology in product marketing and after-sales. Insurance is another area within financial services where AI can have a long-lasting impact. AI, through deep learning, can elevate the region's insurance industry through better products and pricing, underwriting, target marketing and sales, claims management, and overall data mining.

The risk, which other industries face but more so with banks, is that AI will level the playing field for emerging players from other industries, like the technology sector, to compete against incumbent financial giants. It is therefore imperative that existing banking and insurance firms take AI seriously and invest to maintain their differentiation.

Banks have started to utilize AI within their business, raising questions among investors about the economic benefits – i.e. higher client satisfaction and revenue enhancement – and the cost savings opportunities. Within three years, 19% of all digital transactions are expected

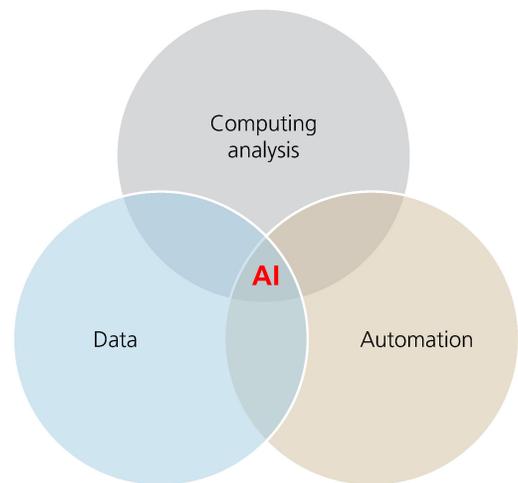
Fig. 17: Evolution of artificial intelligence (AI)



Source: UBS

Fig. 18: Artificial intelligence

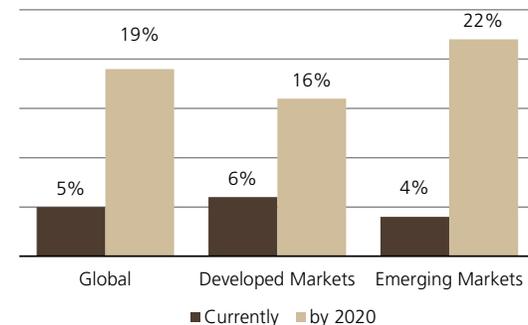
Main components of AI



Source: UBS

Fig. 19: Percentage of digital transactions automated using AI

By 2020, transaction automation should rise sharply



Source: UBS

to use AI versus 5% currently (see Fig. 19), based on an analysis conducted by UBS.

The main question is whether banks will be able to pass the revenue benefits and possible cost savings to their shareholders, or whether the ultimate beneficiaries will only be bank customers.

While we give some credit for the possibilities of revenue enhancement and for cost containment, we are skeptical about banks being the ultimate beneficiaries of these benefits. As almost all banks are investing in AI, we think that early adopters will enjoy an initial competitive advantage, once the initial investment is amortized; but ultimately, such an advantage will fade because the best practice achieved through AI – allowing high client satisfaction, revenue enhancement, and cost containment – will become a commodity and the basis to compete in the banking sector. Conversely, banks reluctant or unable to adopt new technologies will incur client disaffection and high costs, making them less competitive. Initially, the application of the new technology will require investments which will be detrimental for the cost base and banks’ profitability, temporarily masking the benefits such as revenue enhancement and ultimate cost savings.

We do not believe that incumbent start-ups will be able to completely substitute banks in their economic role because banking is about trust and relationship, something that is difficult to replicate quickly and to a large scale. Banks may evolve over time, applying the same technologies used by incumbents, resulting in a reduced diffusion of branches in the form we know them today, ultimately defending their market role and profitability.

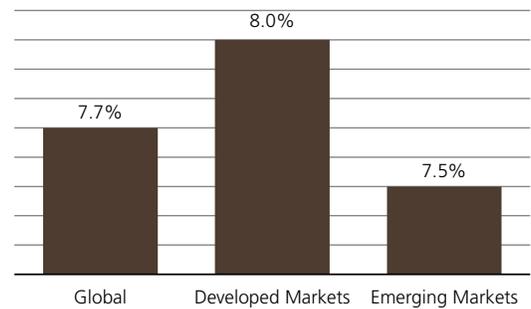
Bill Gates once said that “we need banking, not banks,” but we argue that whoever does banking must be considered a bank and will have to respect tough banking regulations. We are convinced that banks will continue to exist, while possibly not in the form of branch networks that we are used to now. The banks of the future are already emerging, changing the traditional business model based on services distributed through branches and focused instead on online services where AI enhances their performance. Concrete examples are ING Groep and DNB Nor, which reduced their branch networks by roughly 50% in recent years.

Examples of AI implementation

Investments in AI have boomed in recent years and are expected to increase even further, from roughly USD 11bn for the global banking sector in 2010 to more than USD 47bn by 2020, according to UBS and IDC’s Worldwide Semi-annual Cognitive/Artificial Intelligence Systems Spending Guide. Management surveyed by UBS Evidence Lab (144 banks were involved) said that they are directing an average of 7.7% of capital expenditures (capex) towards AI platform development; the difference between banks in developed markets (8.0%) and those in emerging markets (7.5%) is minimal (see Fig. 20).

Fig. 20: Percentage of total capex invested to develop AI platform

Amounts banks in developed markets invest in AI are comparable to those in emerging markets



Source: UBS, as of March 2018

Contract Intelligence

JPMorgan Chase has been investing heavily in technology, and recently introduced a Contract Intelligence (COiN) platform designed to analyze legal documents and extract important data points and clauses. A manual review of 12,000 annual commercial credit agreements performed by human being normally would require about 360,000 hours. Results from an initial implementation of this machine learning technology showed that the same amount of agreements could be reviewed in seconds. JPMorgan invested over USD 9.5bn in technology in 2016, with USD 3bn dedicated toward new initiatives and USD 600m for emerging fintech solutions. Specific interests include partnerships with fintech companies and developing new and enhancing current digital and mobile services (Source: <https://www.techemergence.com/ai-in-banking-analysis/>). Similar initiatives are being undertaken by other major worldwide banks.

P27 project

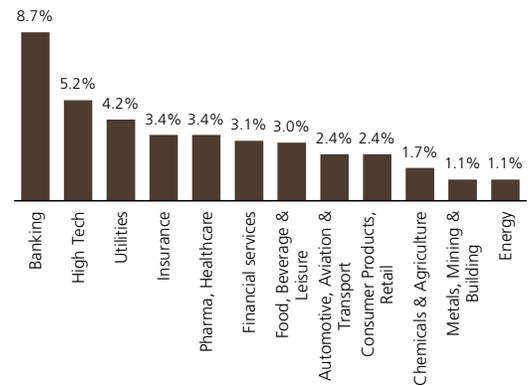
The biggest Nordic banks expect to launch a new financial infrastructure next year, which should dramatically speed up international transfers in one of the world’s already most technologically advanced regions. As an indication, Nordic banks are ahead of their peers in IT innovation and in reducing the number of branches in favor of online services.

The aim of the new technology, the so-called "P27 project", is to clear payments and settle accounts within seconds, regardless of the currency. It will build on the success of smart-phone payment applications that Nordic banks have already created, like Swish in Sweden, Norway’s Vipps, and MobilePay in Denmark. The P27 project is so called for the 27 million people who live in the Nordic countries of Sweden, Norway, Denmark and Finland. This is an effort to stay ahead of global technology giants like Apple and Samsung Electronics as customers no longer rely exclusively on their banks for financial services. The difference between P27 project and the payment apps that Nordic banks currently offer is the cross-border nature of the project. What’s more, transactions won’t face the same caps that existing payment apps do. Getting this infrastructure right is key to the financial industry’s future success. Jesper Nielsen, head of banking in Denmark for Danske Bank, says lenders behind P27 expect to select a company by the year-end to help guide the project, with the first payments possible in 2019. Danske Bank and Nordea Bank are among seven banks behind the project. (Source: Bloomberg).

The banks working on P27 project are also eager to ensure that their project has a hand in shaping a European-wide settlement system. Norway, Sweden and Denmark all have their own currencies. Finland uses the euro. Connecting those four currencies in a common cross-border payment system will give Nordic countries some size power in setting the standards for a European clearing system.

The new rules of the Europe’s "Payment Services Directive" require banks to provide other companies, including rivals and technology startups, access to client-account data if customers want them to. Having a common standard for payments will be very important for

Fig. 21: IT expenditure as percentage of revenues
Total IT expenditure includes IT operating expenditure and IT capital expenditure



Source: Citigroup, UBS, as of March 2018

having an homogeneous database which will ultimately allow even more innovation but also possible disruption.

Live chats

A customer operating on the website of a bank sees a pop-up window asking if he needs any help. The user then clicks the button to initiate the chat. A simple form asks for some basic information and the needed information, in order to route the inquiry to the right person. Simultaneously, the customer’s history loads up on the bank representative’s screen, putting them in contact. The bank representative knows all the details of the client and this allows him to provide help but also to offer financial products that closely meet the client’s needs, possibly boosting the bank’s revenues.

Consumers increasingly expect financial websites to deliver high level services and this applies particularly to live chats which are increasingly appreciated more by clients. From a bank’s perspective, live chats allow the bank to save costs (fewer people are needed in the branches) and boost revenues due to cross selling opportunities.

Additionally, we also see increased use cases in the online lending industry.

Disruption, how and where?

The two businesses that are likely to suffer the most disruption are payments and investments, in our view. Conversely, we expect the introduction of AI to have limited impact on the lending business.

Within the payment segment, disruptors have already made significant investments (i.e. Alipay, WeChat, SamsungPay, ApplePay) and are taking some market share and profits from traditional banks. However, it is not enough to challenge the banking business model which is not centered on payments and actually derives only roughly 7% of its total profits from payments (see Fig. 22), equally split between personal and corporate payments. We believe a major disruption can happen in the personal business, therefore limiting the overall impact on a bank’s business model. The bulk of a bank’s profits comes from lending, which represents almost 60% of the profits and requires deep expertise and knowledge. Everyone is able to lend, but it is difficult to do so safely.

We do not think that AI can support disruptors and online lending providers to the point of substituting a bank’s knowledge. We see problems arising during periods of economic recessions, when traditional banking’s deep expertise on credit-risk and lending criteria might make a huge difference on the quality of the loans provided. Given that the platforms are relatively new, their ability to lend has not been tested during periods of very difficult economic conditions.

Similarly, we do not see online lending platforms, supported by AI, being able to take significant market shares in the corporate business, where ad hoc credit expertise is critical in order to keep the lending business profitable. Conversely, disruptions may take place in the consumer credit (usually with above-average risk borrowers, where current platforms mainly operate) and mortgage businesses, where standard lending procedures may be successful and they will allow market shares to increase.

Fig. 22: Global banks' profit breakdown by product and customer segments

Profit split by customer segments based on company reports, and by product segments based on banks that disclose revenues split by products

Products	Payments	Savings and investments	Lending	Capital Markets	Total
Customers					
Personal/SME	4%	12%	29%	1%	46%
Corporate	3%	6%	21%	5%	35%
Investment Banking	0%	3%	6%	10%	19%
Total	7%	21%	56%	16%	100%

Source: Citigroup, UBS; Note : SME = small & medium enterprises

While we expect online platforms to continuously gain market shares, mainly in niche segments as described above, their growth ambitions might be confronted with a less favorable economic environment going forward. In fact, in the past decade, online platforms have benefited from the synchronized decline in global interest rates, which has significantly boosted credit quality, while simultaneously investors' risk appetite had to increase in order to achieve noticeable returns. We do not know if such a benign environment will continue in future and online platforms will be equally successful in attracting investors. Ultimately, market platforms will anyway have the option to refer to banks or other institutional investors for their funding needs, which would likely reduce profitability but it would allow growth to continue.

The wealth management business is theoretically one of the easiest financial services that can be disrupted by fintech companies as it is a capital-light business. Banks, conversely, have a significant advantage in more capital intense products and services (such as corporate and commercial lending). However, we do not expect fintech innovation to significantly disrupt the wealth management business, particularly with regard to the offer to high net worth individuals (HNWIs) and ultra high net worth individuals (UHNWIs). This is because they generally have sophisticated needs and therefore prefer personal interaction with relationship managers. But more disruption has been noticed in the mass market segment and with millennials, mainly through robot advising, where we think fintech offerings will continue to gain market share.

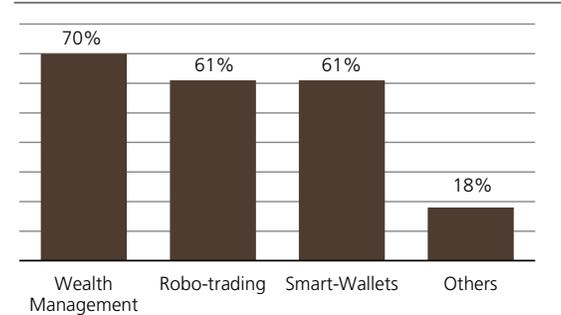
However, it will likely be a very gradual process. In fact, several fintech companies just offer a cheaper but similar service compared to established companies, leaving the price as the major differentiating factor. We think that these business models will take a long time before allowing noticeable market shares gains and it gives incumbents time to optimize their costs in order to provide a similar competitive offer. Robo-advising is the main fintech proposition to enable competition in the wealth management business (such as Nutmeg or Moneyfarm in the UK). We think it will not act as a game changer, but will enhance competition in the form of reduced margins over time for the incumbent companies. Generally, the prices of robo-advisor-based companies are up to 75% lower than those of traditional asset managers; this partially explains the constant price pressure affecting the industry, which is also confronted with extremely low interest rates. Currently, robo-advising has a negligible market share in the industry, but investment banks and experts think that it may achieve roughly a 1% market share in the coming years.

Banks' objectives for investing in AI

According to a survey by UBS Evidence Lab on 144 banks, management invests in AI primarily to "improve customer experience/engagement" (21% of the respondents); cost savings were the second objective (11% of the respondents), followed by cross-selling, financial advisory and customer intelligence (9% for all three objectives) (see Fig. 24).

Fig. 23: Businesses where AI could affect bank revenue the most

Answers provided by banks surveyed by UBS Evidence Lab

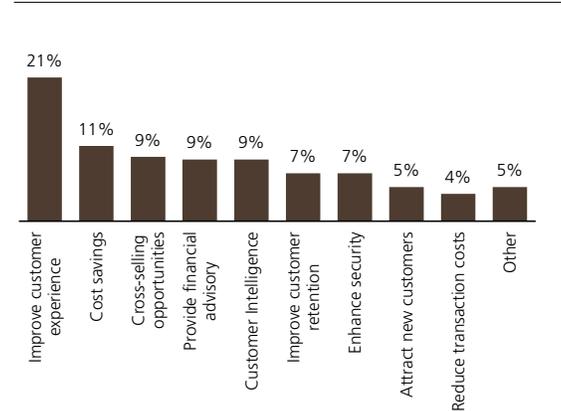


Source: UBS Evidence Lab, UBS

Based on a survey conducted by UBS IB Evidence Lab on the management of 144 banks. Robo-trading = the use of automated technology for stock trading. Smart wallets: digital wallets that replace physical cards and also allow the user to pay for goods and services using their smartphones.

Fig. 24: Banks' objectives for investing in AI

According to a UBS commissioned survey, banks invest in AI mainly to improve customer experience, achieving cost savings and increasing cross-selling



Source: UBS Evidence Lab, UBS

The surveyed banks estimate revenue opportunities from AI utilization to be around 3% over the next three years (Source: UBS Evidence Lab). Incremental revenues are expected to come mainly from the wealth management business (including smart wallet offerings) and robo-trading.

Cost savings are expected to be about 4% of the average costs, according to the survey respondents. AI is expected to mainly help reduce the costs associated with retail banking by replacing back/middle office staff.

If management expectations prove correct, AI will contribute significantly to banks' profitability. While there may be some revenue enhancement and cost containment, we are skeptical about the ultimate beneficiaries of these benefits. We think that if a multitude of banks simultaneously achieve the above-mentioned opportunities, the cost benefits will be ultimately transferred to the customers (via lower prices) from shareholders (via higher profitability) due to the law of competition.

As almost every bank is investing in AI, we think that early adopters will enjoy a competitive advantage, once the initial investment is amortized; but ultimately, such an advantage will fade because the best practice achieved through AI – allowing high client satisfaction, fast procedures and cost containment – will become a commodity and the basis to compete in the banking sector. And banks that are reluctant or unable to adopt new technologies will incur client disaffection and high costs, making them less competitive. This could trigger consolidation in the sector, where players will merge or be acquired in order to achieve economies of scale.

While we are somewhat skeptical about cost savings, ultimately shareholders will benefit through higher profitability. We think that revenue opportunities will be effectively exploited, allowing for revenue and base growth, mainly thanks to robo-advice and cross selling.

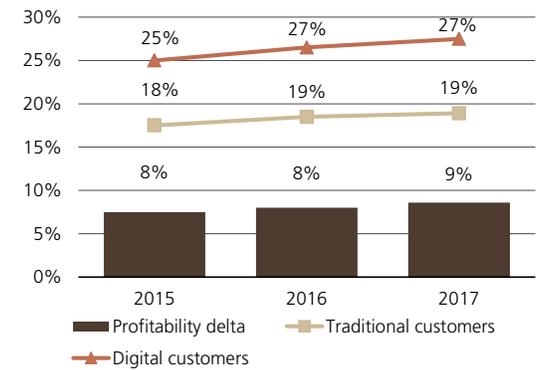
However, the application of the new technology will initially require investments which will be detrimental for the cost base and banks' profitability, temporarily masking the benefits in terms of revenue enhancement and ultimate cost savings.

Benefits of AI to clients

While the process of bank branch reduction is going on well, physical branches still are the primary channel for clients to interact with their bank. Based on a survey conducted by UBS Evidence Lab on 24,000 bank customers in 19 countries, 48% of the respondents used branches to contact their banks in the last year, followed by phone conversations at 44%, internet at 32%, and email and mobile banking at 19%. The survey showed that while there was a high acceptance for interactions with machines and automated answers for simple instructions (46% of respondents accepted automated answers for updates on transactions), the majority of customers are not ready for advice on financial planning (only 14% of respondents accepted it). Robo-advisors are gaining in popularity but it is mainly for micro or relatively small investing (such as Nutmeg, Moneysupermarket, Acorns, Stash, etc.), while large private banking clients still

Fig. 25: Return on equity of traditional customers vs. digital customers

Profitability of clients acquired and managed online is higher than that for traditional clients managed through bank branches



Source: DBS Bank, "Creating shareholders value from digitization", UBS

prefer and require the human interaction given the complexity of their needs.

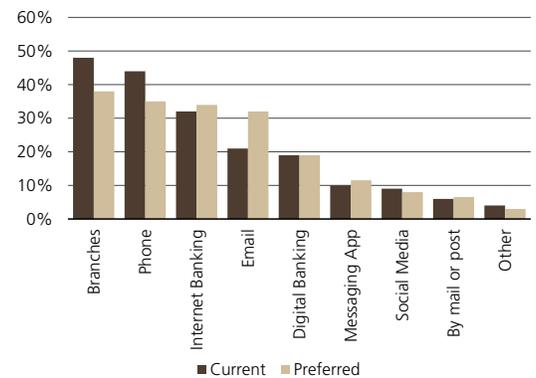
While banks claim that AI will allow revenue enhancement and cost containment, some tech giants (such as Google, Alipay, Baidu, Facebook) or providers of AI solutions to banks may heighten financial competition, undermining the opportunities that currently banks envisage. This is a credible scenario, in our view, and we think that a good part of the benefits deriving from AI implementation will be transferred to clients via lower service prices in one way or another. In fact, we believe increased competition could ultimately result in banks passing revenues/cost savings to their customers via lower pricing or lead to cheaper offerings by AI enablers or tech giants.

Scenario analysis: Between benefits and disruption

In Fig. 27, we show how the benefits and the costs from the application of AI could distribute between banks and customers. We think that the most likely scenarios are "Limited benefits, mainly for banks", where ultimately banks will be able to retain part of the economic benefits, or "Cost savings benefiting customers", where the ultimate beneficiaries will be the bank customers (see the dashed line in Fig. 27). In both cases, the banks' profitability should be enhanced or impacted, depending on the scenario, by a low-single-digit percentage. In conclusion, we do not think that AI should be a key driver for an investor to invest in the banking sector, although it may change customer experience and the way banks run their business .

Fig. 26: Channels used in the past year vs. preferred channels for contacting banks

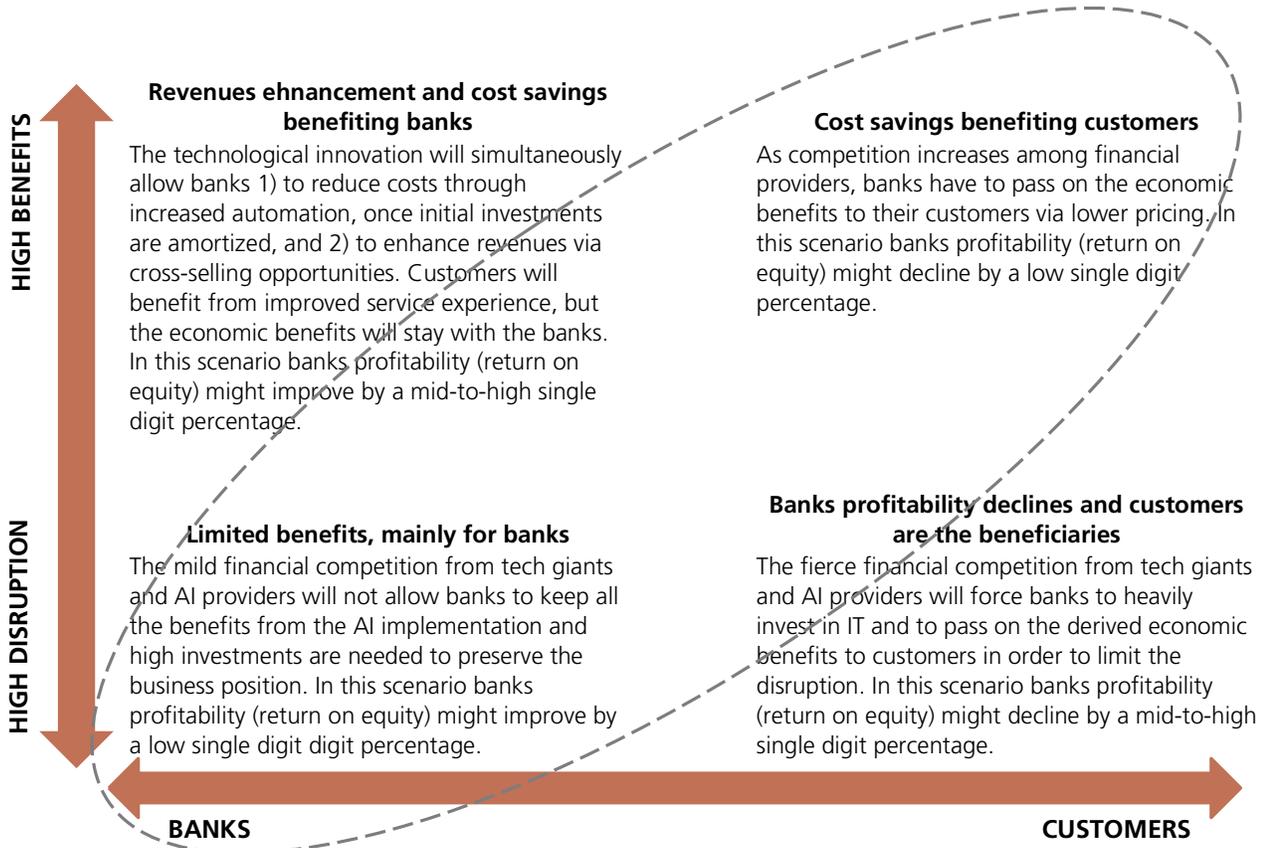
To banks, contact refers to customers' complaints, applications for products/services, etc.



Source: UBS Evidence Lab, UBS

Fig. 27: Scenario analysis: Distribution of benefits and disruption between banks and customers

We envisage four scenarios with different distribution of benefits and costs between banks and customers. We think that the most likely scenarios are "Limited benefits, mainly for banks", where ultimately banks will be able to retain part of the economic benefits, or "Cost savings benefiting customers" where the ultimate beneficiaries will be the bank customers. See dashed line.



Source: UBS.

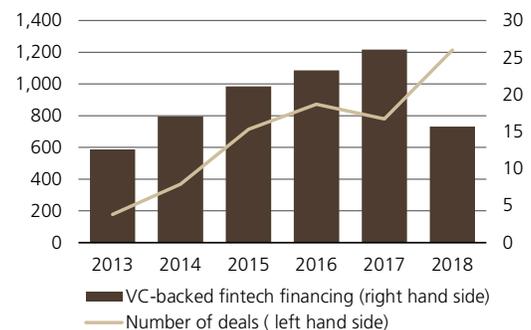
Note: Bank profitability impact estimates are based on our assumptions and calculations, also taking into consideration earnings sensitivity provided by sell side brokers.

Fintech growth fueled by venture capital

With fintech companies still mostly in the startup stage, private investing through venture capital (VC) funds remains the purest way to invest in the sector. Such funds are best equipped to identify promising companies and provide the necessary capital to help fintechs grow revenues and achieve profitability, before exiting their investments via an IPO or a sale at higher valuations. They also offer access points to a company's technology life-cycle, with the flexibility to invest at an early, mid or late stage.

Since 2010, VC managers' appetite for fintech companies has been strong and is accelerating. Using data from CB Insights, we estimate that the sector attracted more than USD 60bn of VC capital over the past five years, making it one of the fastest-growing funding segments of the tech industry. 2018 is on track to be a record breaking

Fig. 28: Global VC-backed fintech deals



Source: CB Insights, UBS, as of August 2018

year, with already USD 26bn of fresh capital gathered in 1H. Managers have largely focused on US startups. But in recent years, funding of Asian fintech startups has increased, especially in China and India. Europe has lagged so far, but activity is picking up.. Managers have also started to finance deals in more frontier markets such as Latin America, Southeast Asia and Africa. Companies developing payments and lending services have traditionally attracted the majority of VC fintech-based investments. Since 2015, however, insurtech has been gaining more traction among investors. Blockchain is also garnering more attention.

Using VC investments to gain direct exposure to fintech can provide access to high growth potential companies across all stages of their development, with the potential for high returns. But such investments naturally come with risk. Besides the inherently higher failure rate of startup companies, VC investments differ significantly from investing in listed shares on the stock exchange. VC is essentially an opaque and illiquid market, in which the same amount of information is not available to everyone. Financing usually consists of multiple rounds of private financing by investors who purchase newly issued, unlisted securities. Each round triggers a capital increase and raises the risk of ownership dilution. Also, shareholder rights such as voting, veto, exit or liquidation rights can differ greatly between founder-entrepreneurs, angel investors, independent or corporate venture funds, and other industrial or financial groups.

Securing access to the best fund managers to mitigate these risks is paramount to maximizing the chances of success. Competition among VC managers to fund the best companies is also very high. Investors should seek partnership with managers who are actively sourcing deals and taking a leading role in the company in which they invest, as opposed to employing a follower strategy and focusing solely on unicorns and bigger deals. Manager selection matters, but so does portfolio construction. Investing in one VC fund has historically proved to be a rather inefficient way to access the asset class. Investors should commit to a long-term plan and build exposure across vintage years, geographies, managers, etc. Importantly, VC exposure should be considered within a global private market portfolio diversified across various private equity and debt strategies, and sized according to an investor's risk appetite and goals.

-Karim Cherif, Strategist

Investment implications

With strong growth seen across fintech verticals over the next few years, we are still in the early stages of rising fintech adoption. Our estimates of rising fintech penetration from low-single digits to mid-single digits by 2025 may be very conservative, given the potential upside risk of strong uptake in emerging markets. Fintech provides both opportunities and risks to incumbents. Companies that embrace technology and are flexible at adjusting their business models should outperform their peers, in our view.

With more than 10% revenue growth annually and moderate margin expansion due to rising scale benefits, we expect our fintech theme to report low-double-digit earnings growth over the next few years. Fig. 29 shows the strong earnings growth potential continuing for our theme. Given our forecast of double-digit earnings growth over the next eight years, fintech should be one of the fastest-growing industries globally. Investors, in our view, will be best rewarded by investing in a diversified way in our theme of fintech companies, with a focus on payment industry leaders, technology companies launching disruptive fintech services and incumbent financial corporations with a clear fintech strategy. Also, we believe companies that are able to create platforms with network effects around emerging technologies like AI, blockchain and analytics are also potential winners.

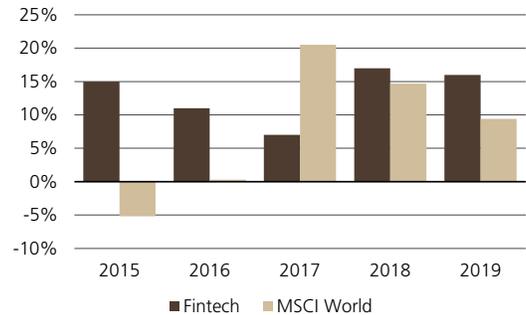
Risks

We believe key negative risks include, but are not limited to:

- Tighter regulations around fintech that could slow down industry growth. As highlighted, favorable regulations are a key growth driver for the industry, as the need for financial inclusion is forcing governments to promote fintech. A tighter regulatory environment may therefore worsen fintech's growth prospects.
- Deflationary pricing continuing for longer than expected, resulting in margin pressure.
- Data privacy and consumer protection concerns. As fintech companies leverage data to provide a wide range of financial services, any potential data breach or cyber crime is a risk. Still, our other Longer Term Investment theme "Security and safety" highlights opportunities from the broader trend of rising spend on cyber security. Also, lower consumer protection compared to traditional products can also slow down adoption.
- The emerging nature of fintech, which means the potential list of winners will likely be more dynamic and should continue to evolve. Hence, investors need to pursue a diversified approach when investing in fintech.

Key positive risks are accelerated M&A transactions, which would promote the valuations of the industry, and more favorable regulations, which would likely facilitate fintech adoption, particularly in emerging markets.

Fig. 29: Strong earnings growth expected to continue for fintech companies (in %)



Source: Factset, UBS, as of March 2018

Appendix

Terms and Abbreviations

Term / Abbreviation	Description / Definition	Term / Abbreviation	Description / Definition
1H, 2H, etc. or 1H11, 2H11, etc.	First half, second half, etc. or first half 2011, second half 2011, etc.	A	actual i.e. 2010A
bn	Billion	CAGR	Compound annual growth rate
Capex	Capital expenditures	COM	Common shares
E	expected i.e. 2011E	EmV	Embedded value = net asset value + present value of forecasted future profits (for life insurers)
Shares o/s	Shares outstanding	UP	Underperform: The stock is expected to underperform the sector benchmark
CIO	UBS WM Chief Investment Office		

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