

# THE EMPIRE STRIKES BACK

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Banking | Technology | Platforms

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## 1 Introduction

The structural change spearheaded in the financial industry in recent years is entering a new phase. Developments to date have been dominated by huge stimulation of the market combined with high pressure for efficiency on all market players. A new structural dimension is taking shape: services – including those offered by financial service providers – are automatically included within chains of action and access to overarching information; they are guaranteed by means of platforms as potential courses of action; and they are pre-selected based on data and artificial intelligence. This heralds a new phase of networked financial services driven by technology platforms. At the center of this phase is a far higher degree of independence and automation on the part of machines and the partial abdication of autonomy on the part of users.

New phase of structural change  
in the financial industry

As far as financial institutions are concerned, they need to continue driving forward the developments initiated in recent years against a backdrop of changed market conditions and increased need for investment. In doing so, they need to focus more closely on the use of technology. The institutions have analyzed the changes and trends, drawn the strategic conclusions and have started gearing the success-critical segments of their market portfolios more closely to the needs of modern-day technology management. Although the dramatic rise of the fintechs has lost momentum for the first time since 2015, the financial commitments remain high. It should be assumed that value chains will be gradually differentiated further.

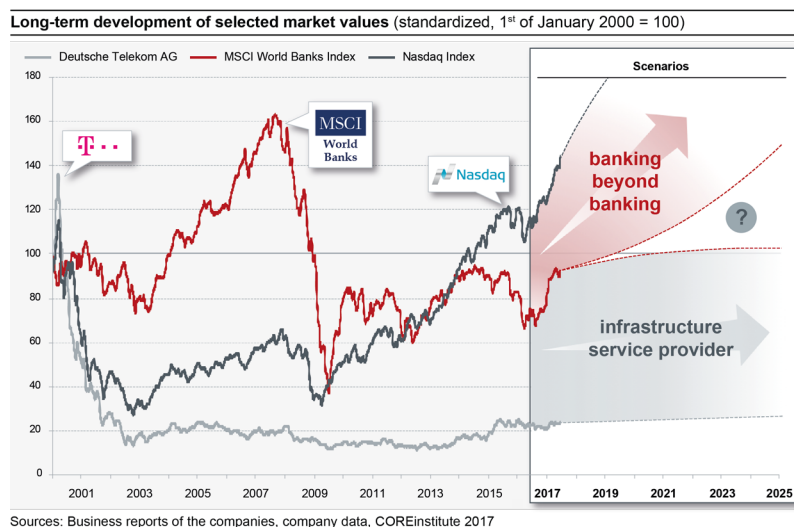


Fig. 1: Scenarios for financial service providers

The second consequence for financial institutions lies in the intensification of their efforts to conform with the model of data-based and platform-driven networking of services within digital ecosystems. Global technology companies drive forward technology-induced developments that lead directly to the stimulation and fragmentation of markets, thus creating new realities: the permanent and automated networking of devices and services in the Internet of Things (IoT); “datafication” of digital events and processes, using them as data for optimization and decision-making (including in an automated manner using artificial intelligence); the

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demand-oriented emergence of new primary markets in the form of platforms. These elements constitute a changed interaction space for market players, with the boundaries of this space becoming increasingly clear. As a consequence, the role of technology companies is evolving from service providers to shapers of the market. Financial institutions, on the other hand, are faced with a choice of acting as infrastructure service providers or fundamentally redefining their role in the light of digital ecosystems (Fig. 1) and thus heralding an era of “banking beyond banking.”

Running contrary to this is the business thinking of technological platform providers. Thanks to the strict monetization of services in defined business domains – starting with payments and followed by lending and trading – combined with the maximum possible level of separation of direct customer interaction on the part of today’s financial institutions, platform providers can generate disproportionately high growth. This is achieved by the virtually free provision of IT infrastructures (cloud) in combination with only partially monetized basic IT services in the field of IT management (administration, analytics, interfaces) and the automated analysis of the customer and transaction data accessed. As a result, better and cheaper offers can be formulated thanks to the widespread use of modern technologies in both frontend and backend applications coupled with artificial intelligence solutions, thus opening up a new customer base.

With this in mind, financial institutions should quickly bid farewell to existing IT management models (e.g. recurrent IT consolidation, programs designed to reduce complexity or the development of integrated IT architectures) in order to harness the ever more fast-paced technological and organizational developments and make use of this potential as they compete with global technology firms. Financial institutions and regulatory bodies can shape these developments in seven areas:

- › **Gearing the management of institutions more strictly toward the efficiency indicators of corporate governance** in order to expand organizational and technological room to maneuver in existing and target markets more forcefully than before on the basis of digital ecosystems.
- › **Identifying and actively utilizing new competition structures** in order to effectively defend existing profit pools and participate in new ones in the future.
- › **Supplementing product canons with financial, security and trust services for digital ecosystems and critical infrastructures** on the basis of the Web economy in order to sustainably and profitably embed these services as digital added value on their own and third-party platforms.
- › **More agile management across all levels of the organization’s hierarchy** in order to be able to respond more quickly to any identified negative or positive business developments; this will result in a greater and more preventative effect in the future to ensure the sustainable success of the institutions.

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Technological platform providers focus on the basic services of the financial industry

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7 main topics on the agenda of executive management

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- › **Building up current technological expertise** in order to successfully tap in to technologies and organizational forms. This goes hand in hand with a vigorous reduction of technological and organizational legacy with a view to establishing room to maneuver for business developments in recognized sectors and expanding newly developed lines of business.
  - › **Breaking down existing sourcing structures and designing new ones** to indirectly safeguard internal efficiency efforts and to achieve greater independence from vendors.
  - › **Active and cooperative approach to devising the legal and ethical standards governing digital ecosystems** with a focus on a European set of values in order to be able to operate successfully against global competitors using battle-hardened mechanisms.

Based on the above, the vision of banks to provide technology platforms is both attractive and ambitious: Based on their inherent capital strength and the competence in technology required in the future, financial institutions may act as guarantor for the security of digital goods and values in a globally digitalized world. Besides ensuring the security of monetary transactions, asset management and bank business, we see potential in the future in the position of trust concerning data and identities associated with strict neutrality compared to both technology enterprises and the state.

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Capital strength and technological expertise as a new paradigm

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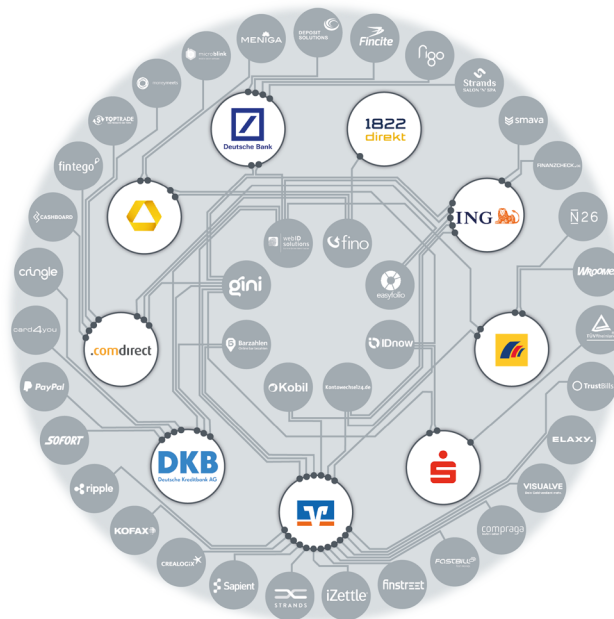
With the considerations outlined above, we will chart some of the key contours of the new phase of structural change. In doing so, we wish to contribute to research into the immense changes arising from technological development – and illustrate the effects and opportunities for financial institutions and their customers, as well as for society, governments and politicians. In chapter 2, we will take stock of recent developments in financial institutions and compare them with the developments witnessed in fintechs. In chapter 3, we will explore the changes and, insofar as they are discernible, the future structures of digital ecosystems and therefore of competitors, and how they are driven and implemented by technology companies. These analyses will set the stage for chapter 4, which will lay out the solution elements for financial service providers in terms of positioning themselves to operate successfully in restructured ecosystems.

## 2 Fintechs vs. Financial Institutions – the Story So Far

For almost a decade, the financial services market has been a challenging environment for established players. On the one hand, conditions have been difficult since 2008 due to the financial crisis and the politically motivated low interest rate climate, although many of the difficulties are no doubt self-induced.

Manifestation of a mutually stabilizing ecosystem in the financial industry

Cooperative relations between financial institutions and fintechs (Germany, selection)



Sources: Handelsblatt 2017, COREinstitute 2017

Fig. 2: The ecosystem of financial institutions and fintechs

On the other hand, the financial industry finds itself in a period of structural change that is largely dominated by market liberalization, technological progress, changes in consumer behavior, fragmented value creation and a nuanced regulatory framework.

These factors have resulted in huge stimulation of the market in the sense of increased innovative capability and speed of implementation and have forced market players to harness potential efficiencies. At the same time, some of the new players have clearly illustrated just how much efficiency potential remains unused in parts of the financial industry.

The global, monumental and successful emergence of fintechs is a clear signal of the change going on in the market. Fintechs benefit in equal measure from market liberalization, technological progress and changes in customer behavior (digital natives) and, with the backing of huge venture capital investments, are forcing their way onto the market across the globe, even if this development has recently slowed down considerably. They use the fragmentation of value creation driven by digitalization in order to isolate specific links in the value chain and generate specific added value within the individual segments of payment transactions, lending operations, asset

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management, business intelligence (BI)/personal finance management (PFM) and, more recently, regulatory intervention (regtechs). In effect, they set new standards for the positioning and internal structure of financial service providers beyond their direct service portfolio.

On the other hand, the established financial institutions have managed to build something positive out of the pressure to change that was being exerted on them due to changes in the underlying and market conditions: they have drawn strategic conclusions relevant to them and have either started driving forward their specialization as providers of niche solutions or have started placing themselves on a broader footing as universal providers of banking services; they have also boosted their efficiency and promoted product-related and service-related innovations and have improved their implementation capacity and their ability to work with various partners, including fintechs. Some of these partnerships are characterized by a degree of emancipation that, ten years ago, would not even have been remotely conceivable in terms of the dealings between senior decision-making structures in the financial industry and less-established players.

As a result, financial institutions have initiated a fundamental change in the financial industry and, with the help of comprehensive measures, have closed the gap with fintechs to within touching distance. By the same token, and in light of the obvious difficulties of sustainably establishing yourself as a broad-based market player, the fintechs are also redefining their role, moving from bank attackers to business partners that work with financial institutions to create a more comprehensive ecosystem for financial services (Fig. 2). In the last ten years, however, no fintech has managed to live up to the expectations that have arisen from the disruptive potential; not only has no critical mass been developed or substantial market share consolidated, but no significant profit pools have been built up. The twin “defend and embrace” strategy employed by the financial institutions has been successful.

## 2.1 Front and Backend Innovation

One of the central innovation patterns of fintechs is the conversion of technological progress into concrete application scenarios with a view to tapping into new forms of interaction in the financial services market. With a sustained ability to innovate, fintechs have not only been able to increase convenience, but also make an impact in the fields of online, mobile payments and blockchains. For their part, financial institutions have also seized on these topics and driven them forward in their own initiatives, some of which are overarching: Twint, Paydirekt and Utility Settlement Coin (USC) are just a few examples. In some areas, such as digital identity and trust services or the storage of confidential documents in e-safes, financial institutions are ahead of fintechs.

The impact of fintechs comes to the fore in terms of front-end innovations. Fintechs have driven forward differentiation between the Web, mobile, and apps, thus delivering major benefits for customers in terms of enhanced convenience and usability. Examples include the boosting of transparency in personal financial management (PFM) tools or the inclusion of design thinking and user experience (UX) approaches in product development.

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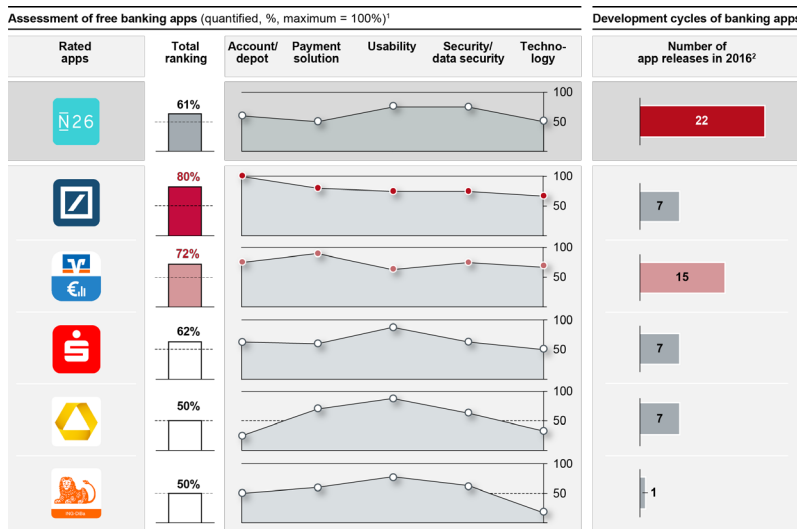
A high degree of emancipation shown by financial institutions in their dealings with fintechs

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Adoption of an embracing strategy by financial institutions to ward off fintechs is a mark of success

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<sup>1</sup> Review of free banking apps with the widest range of features, May 2017 | <sup>2</sup> App releases in the iOS-App Store for iPhones  
Source: COREInstitute 2017

Fig. 3: A comparison of banking apps

Financial institutions have caught up considerably – and have sometimes even overtaken – fintechs by launching apps of their own (Fig. 3): New functions have been integrated and, in some cases, technical and security-relevant aspects have been adapted to go beyond the achievements of the fintechs; UX product design comes as standard, whereas certain functional areas such as PFM or account aggregation are achieved by partners. Overall, the functional level between fintechs and financial institutions has leveled or is set to do so. Taking a look at the speeds of implementation and change by studying the number of go-lives, however, reveals the extent to which fintechs are still capable of raising the bar.

The background for the improved position of the financial institutions is the considerable stepping up of their investment commitment. According to innovation calculations published by the Centre for European Economic Research (ZEW), banks in Germany increased their innovation spending from EUR 3.8 billion in 2012 to more than EUR 4.5 billion in 2015 – thus boosting their commitment more than the automotive industry in proportional terms (Fig. 4); at the same time, innovation intensity, i.e. innovation spending as a share of total revenue, has risen by 11 percent per annum. The fact is that considerable potential has been realized, both in terms of revenue increases and cost reduction: while only 4.5 percent of cost reductions were caused by innovation in 2012, this figure was forecast to rise to 6.5 percent in 2016.

Backend IT applications are an especially rich source of development potential. This becomes evident in a comparison with the recent innovations made by fintechs, such as in core banking systems (Fig. 4). More recent solutions are characterized by high flexibility with release cycles of just a few weeks. To achieve this, they use a different method of launching changes that enables continuous delivery instead of the usual one-digit annual releases. This approach is backed up with the use of cutting-edge software/system technologies and sourcing models, not to mention fundamentally more effective IT cost structures – as demonstrated by the example of Fidor.

The speed of releases has become a strategic lever

At the same time, it is to be assumed that innovative backend concepts – such as the Amazon Cloud-based service of Mambu (a provider of core banking services) – will operate on a tenth of the current cost basis used at Sparkasse and Volksbanken Raiffeisenbanken while ensuring an unlimited number of dynamic release cycles. Even if Sparkasse and Volksbanken Raiffeisenbanken wished to pay the comparatively high IT infrastructure costs in the future, the possibility of an unlimited number of dynamic release cycles would still constitute a huge strategic advantage. This is reflected in providers such as N26 that rely on these concepts and that are gradually gaining market share by means of increased user-friendliness combined with drastically reduced factor costs – without established providers being able to respond in a suitable time frame.

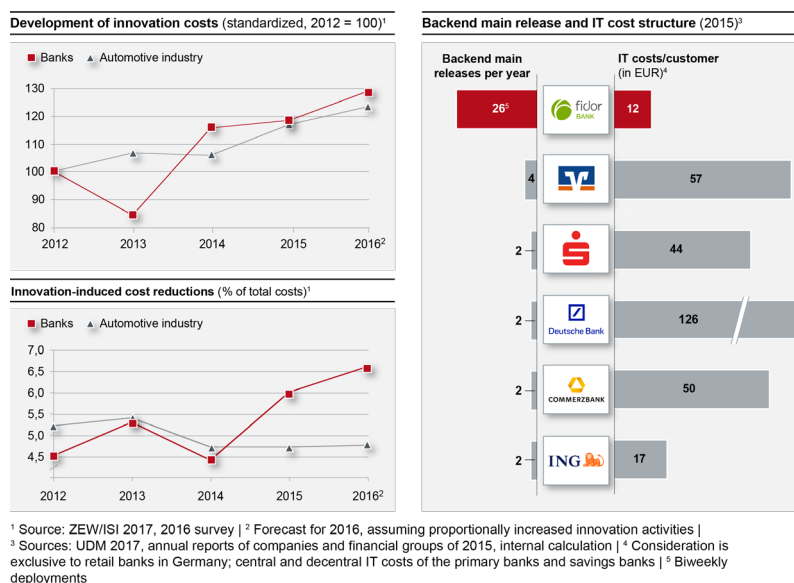


Fig. 4: Innovation structures of financial institutions

Even though financial institutions have driven forward the modernization of their backend systems with varying degrees of success – as illustrated on the German market with the examples of ZVKK/SAP, OSPlus (and OSPlus\_neo) as well as agree21 – these approaches are faced with fundamental challenges, the resolution of which is a key factor in the future viability of the financial institutions involved. Either those currently responsible will make it possible to split up the business processes that, in past decades, have been deeply integrated (with a correspondingly huge level of system complexity) for market policy or internal group reasons and access certain room to maneuver by means of technologically challenging layers of abstraction (however you look at it, this would be a high price to pay). Alternatively, they will find the strength to question the IT concepts that were appropriate and successful ten years ago in light of current needs and allow enough space for alternative concepts in order to achieve the efficiency increases necessary for successful market positioning (potentially doing so more rapidly and with a greater likelihood of success). We are working on the assumption that the governance models of private banks are more conducive to enabling this step than cooperative and savings bank (Sparkasse) organizations, which are institutionally more geared to balance and decentralization.

The future of monolithic or massively integrated core banking systems is uncertain



## 2.2 Leveraging Efficiency

The emergence of the fintechs was and is largely due to the leveraging of the efficiency potential harbored in the financial services system, irrespective of whether it lies in product design and convenience, implementation speed and costs, administration structures, the balancing of social interests or overarching group structures.

The efficiency potential of financial institutions remains under attack by fintechs

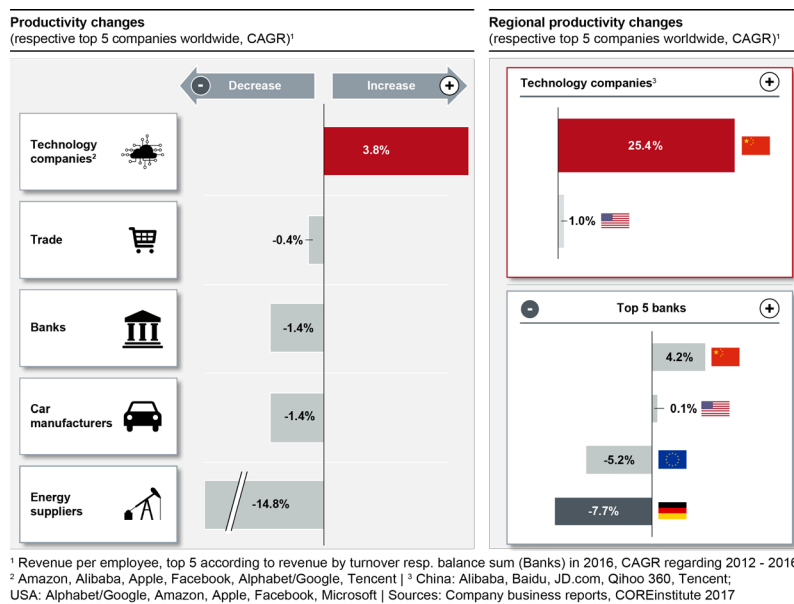


Fig. 5: Comparison of productivity figures between 2012 and 2016

Financial institutions have accepted the challenge of increasing efficiency and productivity. They are increasingly optimizing their decision-making processes without forgoing the necessary involvement of stakeholders and the weighing up of risks. One long-term effect is reflected in the reduction of the cost-income ratio, which – according to World Bank data – has improved, on average, from more than 60 percent before the turn of the millennium to approximately 50 percent in 2014. A nuanced analysis can be performed on the basis of productivity development (Fig. 5). In a global comparison of different industries, banks are competitive: with a 1.4 percent drop in productivity between 2012 and 2016, they are operating at a similar level to automobile manufacturers, but are lagging well behind technology companies, which were able to boost their productivity by 3.8 percent. A detailed study of the banking sector, however, shows considerable differences, with striking fluctuations not only emerging between countries and regions, but also between individual institutions. While the differences may be accentuated by one-off effects, the overall picture is clear: some institutions are gradually improving, whereas others are failing.

## 2.3 Implementing and Maintaining Agility

One of the greatest assets of the fintechs is their agility, which they seek to preserve across growth phases and subsequent consolidation phases. Successful examples from other industries (spotify in the music business, hubspot in marketing and zalando in e-commerce) illustrate which organizational structures are effective across agile project approaches. On the other hand, financial institutions have largely consigned their dogmatic

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adherence to sequential models (waterfall/V-model) to the past – partly due to positive experiences of partnering with fintechs. Financial institutions have at least piloted agile methods, with some already using them more broadly.

As a result, the models that facilitate optimized implementation in terms of functionality, speed and cost are those that will survive. In many cases, these will be agile or hybrid models. It remains to be seen to what extent the resulting effects can also be harnessed for units separated as operations (such as by means of DevOps models) and for outsourcing agreements.

The same applies for the sourcing models routinely used by fintechs for software development, which are more or less completely based on the use of native cloud concepts and micro-service architectures. In real-life contexts, it is being demonstrated that, with relatively marginal IT infrastructure expenses, the focus can be shifted toward functions that actually differentiate the market, even if this sometimes occurs out of the sheer necessity engendered by under-capitalization. In the medium term, it will be interesting to see whether institutions begin to outsource software developments in larger chunks with the same intensity with which IT infrastructure was outsourced ten years ago. From a global standpoint, these developments can be witnessed at a perceptible and therefore relevant level at Zurich's Paradeplatz, as well as on New York's Wall Street and its offshoot, the City of London.

Changes in skill management and sourcing still pose a major challenge for financial institutions. Even if a comprehensive shift in culture and mentality is initiated within the financial industry, the improvements made have still resulted in precious little progress in terms of employer attractiveness for the highly sought-after target group of STEM graduates. Newer sourcing concepts with greater differentiation between quantitative and qualitative elements have only been established to a limited extent, whereas the persistence of long-standing provider networks often exceeds the number of effective and efficient new agreements. What's more, there are often no flexible processes for onboarding and offboarding vendors. Particularly in light of continued agilization, both changed ecosystems and the complete outsourcing of development structures will be established – and financial institutions will need to help shape them.

#### 2.4 Equalization of regulation

As fintechs are subject to less regulation than financial institutions, they currently enjoy a competitive edge in this area. The more important individual players – and the fintech sector as a whole – become, the more relevant fintechs will be in terms of financial market stability, consumer protection and government revenue. European and German regulators have announced plans to tighten up their approach; fundamental recommendations from the EU Commission's Task Force on Financial Technology are expected in the first half of 2017.

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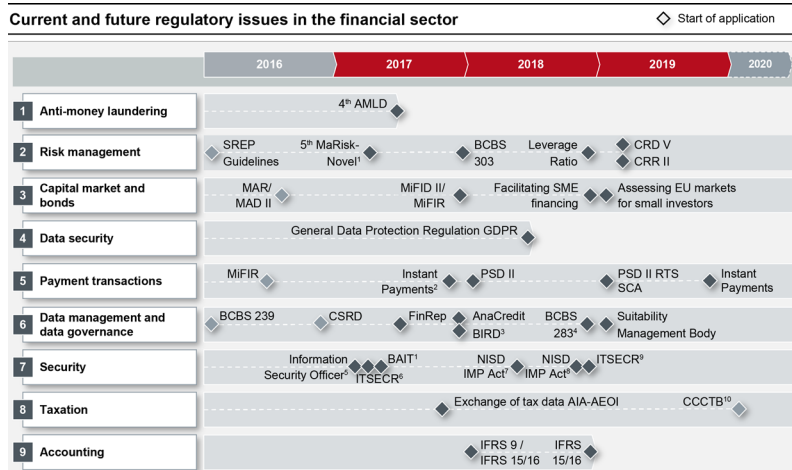
Breakthrough of outsourcing software development is imminent

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Regulatory expertise and the ability to adapt are competitive advantages

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<sup>1</sup> Enforcement expected by summer 2017 | <sup>2</sup> Volunteer support of instant payments ability | <sup>3</sup> Banks Integrated Reporting Dictionary | <sup>4</sup> Complete implementation by the end of 2019 | <sup>5</sup> Integrated into BAIT | <sup>6</sup> German IT Security Law, reporting capacity from Q3 2017 | <sup>7</sup> National implementation by May 2018, enactment by the Federal Cabinet of Germany on 31.05.2017, enforced in June 2017 | <sup>8</sup> Identification and reporting of critical operators by 09.11.2018 by BSI | <sup>9</sup> Minimum level of security from Q1 2019 | <sup>10</sup> Common Consolidated Corporate Tax Base | Source: COREInstitute 2017

Fig. 6: Trend in regulatory intervention

For financial institutions, the regulatory situation is set to remain comparatively complex and demanding in the years ahead (Fig. 6). If financial institutions manage to expand their expertise in relation to regulatory requirements and optimize their implementation capacity, they will have a competitive edge on fintechs, on rivals from the financial sector and – by virtue of the continuing liberalization of the market – on other players such as technology and data companies with their platform-based approach.

However, we can see the first signs on the market that technological platform providers are thinking of seizing the opportunity offered by regulation, as market rules are being altered or fleshed out as, on the one hand, new providers can harness associated structural benefits, whereas established providers are exposed to a fundamental conflict in the form of “technological, organizational and cultural legacy” that has barely been resolved or not at all, thus sapping the potential necessary for future market success.

The challenge for financial institutions lies not in continuing to incorporate regulatory requirements in outdated technology bases and backend systems at unacceptably high expense, but instead to combine the possibilities of new technologies, development models and regulatory requirements in such a way that competitive edges and business potential can be leveraged.

Technology providers identify regulatory intervention as an opening to the market



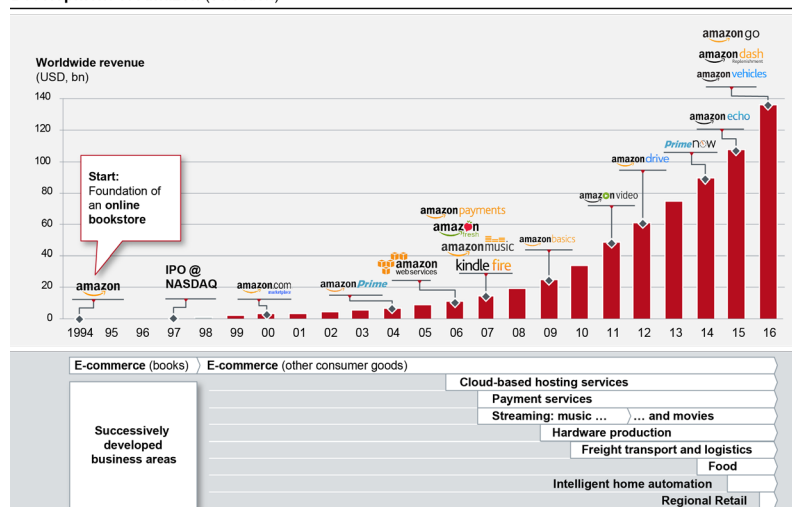
Read more on the COREtechmonitor

### 3 New Phase of Structural Change Technology Platforms vs. Financial Institutions

The challenges in the market for financial services are changing in two respects. On the one hand, the market is consolidating more strongly with a growing level of maturity – both in terms of financial institutions and fintechs, without the demands for increasing stimulation and efficiency increases diminishing. On the other hand, global technology companies (platform providers) are forcing technological developments and thus taking the competition and the rules of the game to a whole new level.

Technology platforms vs.  
financial institutions

#### Development of Amazon (selection)



Source: Amazon 2017

Fig. 7: Development of Amazon

As a result, the current situation can be summarized as follows: for financial institutions, the marginal utility of previous consolidation efforts has been reached, the development of fintechs shows signs of incipient stagnation, and providers of technology platforms are unleashing an unprecedented form of market stimulation (network effects). While attempts to counteract this development by means of lobbying in Berlin, Bonn or Brussels may seem enticing, an objective assessment of overarching global forces reveals that such lobbying has little hope of success. In fact, it would be akin to the Luddite movement, as the efficiency potential offers a far greater benefit to society as a whole than the no longer appropriate protection of particular local spheres of interest represented by individual institutions or groups.

#### 3.1 Consolidation of Financial Institutions, Stagnation of Fintechs, and Stimulation of Technology Platforms

The financial industry has been steadily consolidating for decades. The number of financial institutions in Germany, for example, fell from 2,741 in the year 2000 to 1,960 in 2016; the number of branches dropped from nearly 60,000 to below 36,000 during the same period (Fig. 8). Similar trends can be observed across all banking groups in Austria and Switzerland. In addition, IT core service provider structures have been consolidated: the Sparkasse group and the mutual FinanzGruppe have had just one such unit since 2000 and 2015 respectively. The same trend can be observed in

the area of clearing houses: while there are still several clearing houses in the Sparkasse group, DZ BANK and WGZ BANK merged in 2016 to form a single clearing house for the entire Genossenschaftliche FinanzGruppe.

At the same time, the number of checking accounts managed online has risen from about 10 million in the year 2000 to more than 60 million in 2016 – a reflection of the fundamental change in supply and demand structures in the financial services sector. The tipping point away from branch dominance, and toward online dominance, was reached about 10 years ago, although it has only recently found its way into the strategies of financial institutions. In the same period, Amazon has managed to build up a base of 44 million active customers in Germany and pool its product canon under the Amazon Prime platform tool, which perfectly illustrates the pace of change.

Delayed awareness, acceptance and reaction times result in structural disadvantages

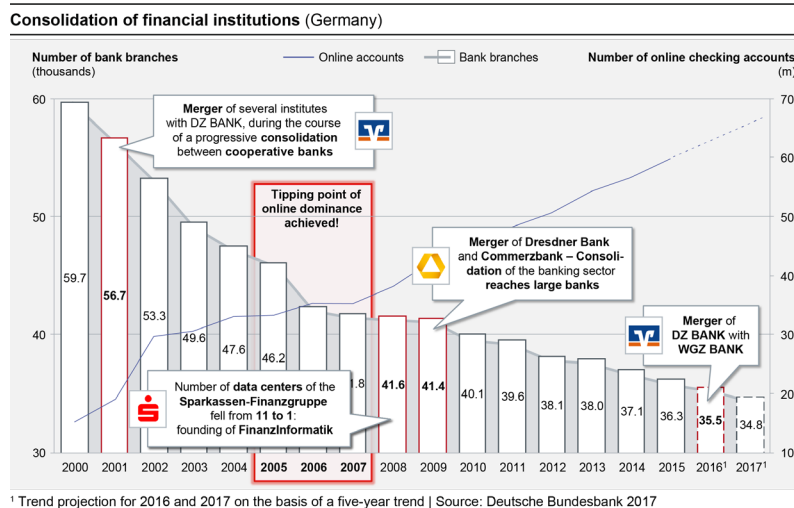


Fig. 8: Consolidation of financial institutions vs. growth of online accounts

The financial institutions have addressed efficiencies defined by consolidations and are increasingly leveraging the potential they offer. The newer potential (such as a systematic focus on online services as opposed to basic branch services), which results primarily from changed customer behavior, is not an area of focus and has not been sufficiently harnessed thus far – and with far less energy than the technological possibilities allow.

In fact, the decades-long move to consolidate is coming to an end in key areas. As a result, one of the dominant patterns of the financial industry over recent decades – consolidation to boost efficiency and satisfy tougher market conditions – is falling apart. The only way to extend this pattern would be to activate consolidation potential beyond the pillars of the German banking system, which – as far as we are aware – is being considered as a valid option in the strategy discussions of the appropriate committees. Nevertheless, this would not satisfy the ongoing and ever more fast-paced efficiency pressure arising from technological and process development. The experience of other industries teaches us that these processes were only interrupted by consolidation in cases where consolidation was required on a much smaller scale. German examples are the steel industry (Klöckner, Thyssen, Krupp) and the computer industry (Siemens, Nixdorf).

Consolidation is just one of the levers for IT management, but is by no means key in the future

As far as the fintechs are concerned, the first signs of stagnation are becoming evident. Following continuous increases up until 2015, VC investments have fallen sharply for the first time, even though the slowdown is more pronounced in other industries (Fig. 9).

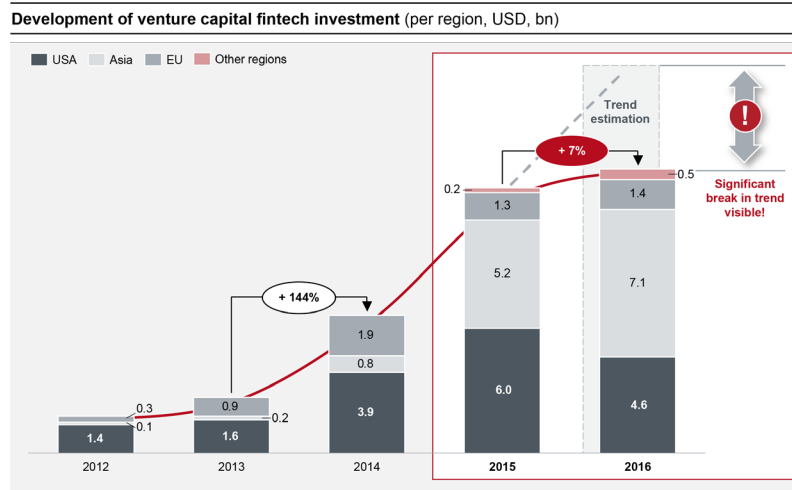


Fig. 9: Incipient consolidation of fintechs

The decreasing momentum is also reflected in an analysis of the banking segments addressed by fintechs. In the payments segment, the growth trend has, for now, come to a halt, which is reflected in the relatively weaker growth of new players (Fig. 10). This view is also supported by activities in the field of M&A. Regtechs, which more than doubled between 2015 and 2016, are the exception, which is due to the fact that this segment still finds itself at an early stage of development.

The structural cause of this emerging stagnation is that the fragmentation of value chains driven by fintechs is not suitable as a base for new approaches to value creation and business models with disproportionately high value. In the past, fintechs were able to use new technological possibilities and break down existing value creation patterns; by taking this approach, they managed to remodel banking products and services against a digital backdrop. While key impetus for innovation arose from digital modularization, the expectations of investors in terms of market growth, profitability and resulting company value could not be met.

This emergence is currently the preserve of the technology companies, who have stimulated market growth, profitability and company value in a historically unparalleled way. The success of these companies should not divert attention from the fact that the assessment is based on disproportionately high annual growth rates and that this growth can only be satisfied by exploring the potential of other industries. For the managers of financial institutions, it is therefore essential to develop preventive strategies for defending against and handling technology companies in order to create competitively viable scenarios for customers, employees and shareholders.

The fintech boom  
is losing momentum

The horizon of expectations in  
fintechs remains largely unfulfilled

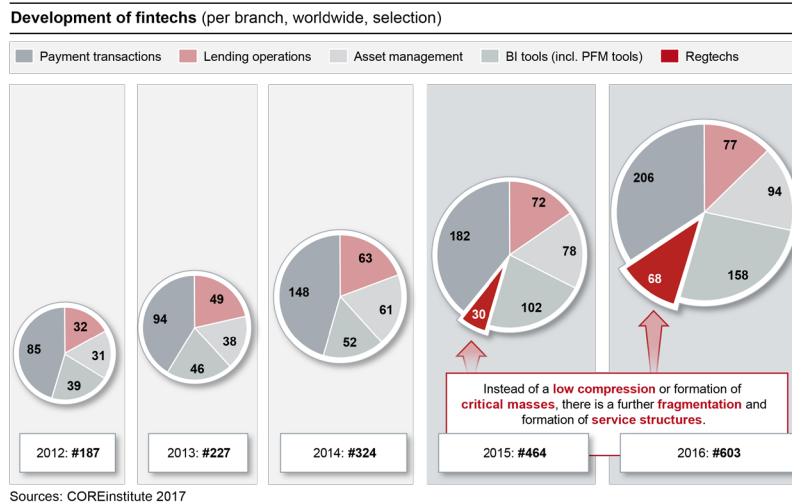


Fig. 10: Differentiation of the value chain by fintechs

### 3.2 Elements of the New Phase of Structural Change

The model for success of technology companies is largely based on tapping into digital ecosystems – underpinned by the systematic use of technology and agile methods and measuring the extent to which each and every transaction can be quantified and optimized. In addition, they also seek the permanent and frictionless dovetailing with other ecosystems; this can be seen in the experiments of Google and Apple in the payments segment. They are therefore positioning themselves squarely behind a product-oriented approach that ensures the digital availability of products that are already available offline, and are establishing fundamentally new structures within which humans and machines can trade, do business and interact with each other.

The global technology companies are gearing their business models to specific technological axioms:

- Devices and services are fully integrated into the Internet of Things (IoT) or Internet of Services (IoS).  
In principle, this comprises the sum total of all controllable entities, i.e. all power and network-enabled devices that can be made accessible to any digital ecosystem as a source of information and a recipient of commands with its own device-specific IP address.
- All events and processes are made available in the form of data and data flows (“datafication”).  
First of all, the data collected is evaluated using machine-learning methods, although big data analysis tools may be considered depending on the volume of data concerned; thanks to the comprehensive network offered by the IoT, the data can then be used and evaluated in virtually any ecosystem in order to devise stimuli for action and initiate optimizations in as automated a manner as possible.

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3 elements of the new phase  
in structural change

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- › Primary access to supply and demand is via information, trading and communication platforms.

They are established and occupied as primary markets in order to ensure supremacy over the market mechanisms, interfaces and shared data; by virtue of the network effects, this leads to de facto concentration in monopoly-like structures. The mechanism lies in the creation of extended transparency in terms of market offers and the occupation of the customer interface by involving customers in the interaction.

This needs to be understood by company managers, politicians and regulators and linked to technology companies' annual growth ambitions of at least 10% in order to shape the competitive environment – which is, by necessity, based on ousting rivals – in the long term. This link is understood in the strategy departments of the groups that make up the German financial services industry, as well as in the financial institutions themselves. Are they reacting? This can be clearly answered in the affirmative. Are they reacting appropriately with the necessary consequences and with the willingness to abandon existing behavioral patterns, suppliers and personal networks? In light of previous recommendations from groups and the decisions of larger institutions, this question, on the other hand, can clearly be answered in the negative.

### 3.2.1 Networking as a Structural Element (Internet of Things)

The advancement of networking – and the consequent establishment of the Internet of Things – results in a fundamental change in the architecture which collects and processes information, and how control stimuli can be disseminated and used. It is estimated that the number of objects integrated into networks using unique IP addresses (IPv6) will increase more than threefold to over 20 billion devices by 2020, compared with 2016 (Fig. 11).

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Anything that can be networked  
is being networked

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As the prevalence of mobile bandwidths (5G) will rise dramatically at the same time, the growing networking of devices will give rise to changed usage possibilities, such as the embedding of high-resolution videos or natural voice interaction with linked artificial intelligence systems. Harmonizing these changes with business-relevant processes or essential auxiliary processes such as AML (anti money laundering) or KYC (know your customer) will not be possible either at a sensible cost level or in the required time frames using current IT architectures, as mass data will need to be processed at virtually real-time speed in elastic system environments.

As a consequence, the IoT is characterized by structural characteristics that are crucial for further usage possibilities and, first and foremost, business potential. Maximum connectivity (or networked access) prevails in the IoT, as all devices – and the people they represent – can communicate with each other in real time. What's more, the IoT is "always on", both in the sense of non-stop reachability (24/7/365) and the inability to switch it off.



Algorithms and meta languages will ensure the ongoing and automated optimization of data analysis and hence process optimization (an aspect that gives rise to the dystopian notion of being controlled by artificial intelligence). After all, the IoT is based on the principle of decentralization, with local structures authorized to make decisions. In turn, the importance of centralized influence will gradually dwindle.

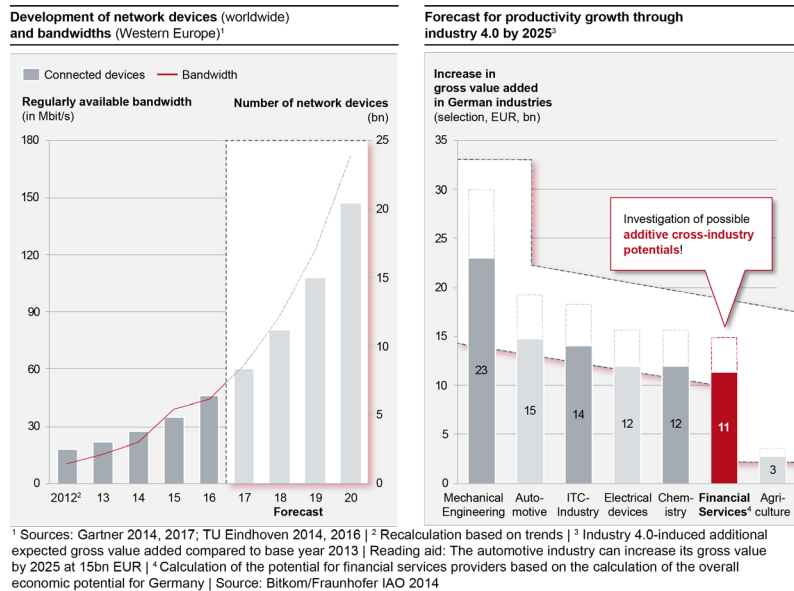


Fig. 11: Networking and potential

### 3.2.2 Datafication as a Structural Element (Artificial Intelligence)

Datafication describes the development that – a bit like electrification toward the end of the 19th century – makes data available regardless of the way it was generated and uses this data as a basis for identifying connections and patterns that, in turn, facilitate the generation of added value. Evidence for the growing importance of data is the exponential increase of the annual data volume generated worldwide, rising from around 860 zettabytes in 2015 to an estimated figure of 4,000 zettabytes in 2020, which corresponds to an increase of 36% a year.

This growth is flanked by a sharp rise in the available computing power. Whereas it took, on average, several minutes to analyze a few exabytes back in 2015, the same analysis can now (2017) be performed in less than a second thanks to new technologies and applications; the effects in various efficiency dimensions (planning, production, supply) have proliferated by the hundreds. Alongside the rise in data volume, our ability to analyze and interpret data and to extract control and decision-making stimuli from it – including in an automated fashion – is developing all the time.

As a result, datafication leads to a whole new understanding of events and processes that is based on three elements. Events and processes – or whatever the case may be – are made available in the form of data and are harnessed for data-based or data-related analysis, optimization and incen-

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Data forms the basis of autonomous artificial decision-making systems

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tivization in various contexts. A comprehensive set of analysis tools can then access the data. Some tools use a sophisticated mix of algorithms and heuristics, whereas others extract insights from the mass of data. Finally, machine learning/artificial intelligence methods (or big data methods depending on the data volume) can be used to help develop algorithms that allow models to adapt and optimize themselves. These developments can be used, for instance, in the trading and compliance departments of banks in order to strengthen the factual and data base of scenario calculations and, in particular, to further automate compliance processes.

### 3.2.3 Ubiquitous Access as a Structural Element (Technology Platforms)

Platforms are key drivers of development and success models for digital ecosystems. In their function as intermediaries, they enable the participants on platforms to engage in digital communication, interaction and transactions in various trading contexts such as information, communication, retail, bartering, purchasing, entertainment and travel. As a result, platforms give rise to new intermediary structures within digital ecosystems and on the margin with the offline world that exhibit specific characteristics.

Information, trading and communication platforms constitute central forums and hubs on which producers and consumers (or providers/senders and customers/recipients) come together (see Fig. 13 below). Platforms separate sales from production by offering a uniform and producer-independent forum for providing and obtaining products and services. On the consumer side, the transaction costs are more or less zero, whereas producers can slash sales costs at the expense of supremacy over the right to sell on the platform. Alongside the broad horizontal effect – i.e. the acquisition of many participants – a vertical effect can also be discerned in some areas, as individuals can largely be steered to individual platforms for certain activities.

Platforms are the modern-day equivalent of market places, boasting high concentration power due to network effects. On the one hand, platform providers act as the designers of these markets and open up digital interaction opportunities for participants; on the other hand, they regulate or restrict access to the markets and exclude market players or compel them to meet certain conditions. Besides the concentration aspect, the expansion of the markets themselves or the available services is another characteristic. Having started out in 1994 as an online book retailer, Amazon is now a designer of digital markets in such diverse areas as entertainment, payment services, food retail, logistics, used cars/automotive parts and smart home/connectivity (see Fig. 7 above).

Another key attribute is the permanent availability of these markets across all online channels. This stands in direct contrast to market mechanisms such as branch opening hours and indirectly taps into further differentiation opportunities such as premium access options for individual customer groups.

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Technology platforms develop atypical high gravitation forces

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### 3.3 Players in the New Phase of Structural Change

Technology companies combine these two elements and use them to create new structures of value creation and therefore competition (Fig. 12). Worthy of note here are the different approaches in the value strategies pursued. In the case of the banks, growth in profit is far greater than growth in revenue; in the case of platform operations, this is the other way around, at least as far as US technology companies are concerned. Here, the growth in reachability outstrips growth in profitability. This validates an axiom that many people have long forgotten: the axiom that IT “enables” business.

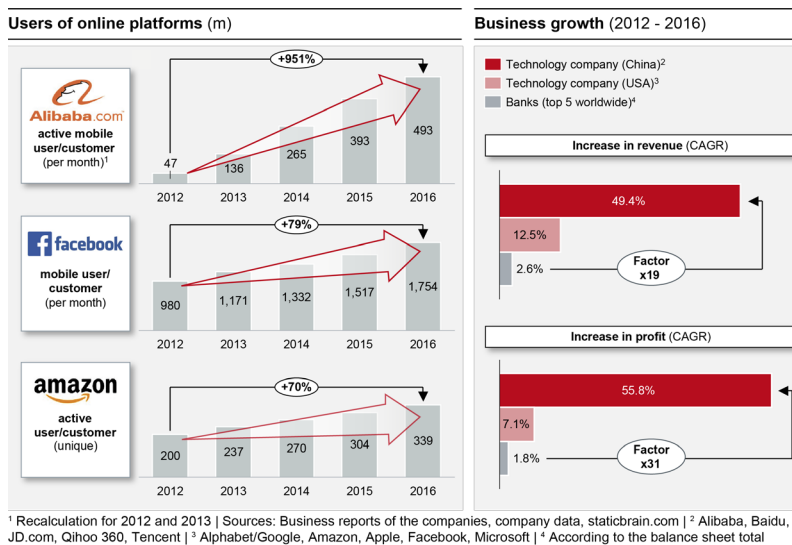


Fig. 12: Growth in technology platforms

Platforms offer central access media for clearly separate activities: research, communication, self-promotion and trading. Further services are integrated into these basic activities that play either a direct supporting role or that are otherwise relevant. Finally, the activities and integrated services are systematically regarded and analyzed as data before being displayed back directly to users or made available for further value creation.

This trend toward concentrating access, integrating in digital operating contexts and combining with a wide range of data and measurement points encompasses all products and services in the analog and digital realm, changing them in a fundamental manner: products and services are no longer separately experienced, but rather as networked information or control entities; they are no longer understood as products, but rather as an aggregation of data; and they are subject not only to the rules of the market economy approved by governments and legal systems, but also to the de facto standards of private enterprise. These de facto standards include limitations imposed by technology companies that serve to exclude other market players and national statutory authorities.

Development of new markets by means of optimizing reachability, followed by monetization

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This pattern can be illustrated using the example of payment transaction solutions. Technology companies have long been trying to establish them more firmly on the market in conjunction with current solutions tied to specific devices and operating systems. Apple, Google and Samsung have rolled out their solutions in more than 15 countries. There are, however, considerable differences in the success of regional market penetration. While more than 2,000 credit card issuers in the US participate in Apple Pay, this figure is a mere 23 in the United Kingdom and just two in Switzerland. In Germany, there is no proper access other than the workaround solutions offered by Wirecard. The road maps for the roll-out in other countries have been drawn up, talks with issuers around the world are being intensified and the development is not over from the point of view of the challengers. Germany is very high up the list of priority markets, as the potential is substantial and because the solutions available on the market cannot be operated in either a coordinated or an efficient manner. Furthermore, there is no indication that the German credit services industry has anything akin to a battle-hardened, user-friendly response that is sustainably geared toward the commercial success of financial institutions.

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Payment transaction solutions pursue both direct and indirect monetary goals

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With their mobile payment solutions and the integration of payment functions (e.g. in Google Mail or Facebook Messenger), the technology companies are not pursuing direct monetization objectives. In fact, the objectives lie, first and foremost, in networking in the sense that payment services are incorporated into other operating contexts and thus have an indirect value creation effect; secondly, the aim is to absorb the data that arises through the use of the service and, thirdly, to strengthen the platform as an anchor in terms of occupying the customer interface. Customer points of contact and relevant revenue streams for the financial institutions are coming under threat, with no possibility of compensation. Therefore, technology companies are not entering established markets as players from another sector. Instead, they are altering the fundamental competition structures and thus acting as “game changers” in many markets.

### 3.4 Business Potential in the New Phase of Structural Change

Alongside the leveraging of the huge efficiency potential arising from technological progress, there is also further untapped business potential arising from the infrastructure requirements of the new rationale. In light of the extent and significance of these developments for economic growth, the issues of security and digital trust are of paramount importance. The availability and integrity of systems and applications, as well as the confidentiality and authenticity of data and communication, are fundamental for the functioning and acceptance of digital agencies. Security and trust are critically important from numerous points of view, as underlined by the revelations of the recent past. The revelations of Edward Snowden and the most recent Vault 7 leaks highlight the vulnerability of infrastructures, as does the questionable behavior of those involved, particularly on the part of administrations.

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Security and trust products have a large potential for growth

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Given the level of conceptual relevance, security-related topics have previously played a minor role in the product management work of the financial institutions. On the product side, security has only been implemented to a limited extent, regardless of whether by design or by traffic; marketing and sales departments provide reassuring statements; customers rely on the information provided by vendors and remain unaware of the extent of the insecurity; governments and critical infrastructures are still taking a reactive approach, although they could build security into consumer protection. Expertise in questions of digital security lies, on the one hand, with the security services (who are actually focusing on how to exploit vulnerabilities, which – in their view – is justified by the need for a set of digital espionage tools to deploy against “threats”) and, on the other hand, with the technology companies.

By contrast, technology companies have a huge interest in security and stability, but are increasingly becoming central IT infrastructure providers in a globalized world. Here, however, security and privacy are structurally motivated by private enterprise concerns and enter the equation as risks, along with various other factors. This makes it necessary for companies to only strengthen their own infrastructures and business models to the extent that it makes short- and medium-term business sense to do so. The fundamental unavailability of security and trust elements cannot be ensured in a civil society based on the values of the Enlightenment – and a critical infrastructure can therefore not be established on this basis. The result is a construct in which the particular interests of the technology providers, the security industry and the security services stabilize each other.

A highly lucrative niche, with the potential for sustainable earnings, can be found within this multidirectional mix of interests between the state and the technology industry. This niche, however, will largely be filled with new offers supported by technology. Here, a joint effort between the financial industry, researchers and politicians – including from a European perspective – would no doubt be a worthwhile objective.

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## 4 Initial List by Financial Institutions for the New Phase of Structural Change

The changes taking place between interpersonal and automatic interaction spearheaded by technology companies are resulting in new patterns in competition. Thus, autonomous tiers concerning the availability of services are emerging in the form of technology platforms, i.e. production and sales are being treated as separate processes; this is hitting well-established, production-focused industries with their own sales force hard. Discussions on new mobility concepts, for example, show that at least a part of the product-gear or manufacturing-centered process overlaps as a result of concentration of coherences, in which various partners and product providers across the boundaries of industries are part of. This results in end-to-end use cases across industries generally becoming the norm, and fewer being representative of the exception often discussed.

Immense room to maneuver is opening up for financial institutions to develop products and services in the completely digital and industrial context of the “Internet of Things” through networking, datafication and platform approaches. On the one hand, this comprises the integration of existing financial products into concrete contexts in terms of users and, as a result, their embedment into platforms. On the other hand, this entails independent ecosystems being set up separately in order to combine product and services with offers in digital contexts. At any rate, this approach is generally accompanied by revised requirements in terms of the design of the offer for digital financial products and services.

Furthermore, the changes due to networking, datafication and platform approaches concern, firstly, competition and its rules: how services are positioned on the market (and who proliferates by it). This has a significant effect on the structure of these services. After all, although the products and services continue to generate the same answers to similar situations of demand, requirements adapt to internal components of these services. Consequently, interfaces have to be created in order for them to be integrated, or the supply of data has to be included, not in addition, but as an integral part, for example.

Secondly, these amendments lead to a change in the needs and expectations of the users, i.e. they influence what becomes positioned as a service on the market. The mobile availability of digital functions and ecosystems results in innovative courses of action, for which appropriate services can be formulated. By contrast, the availability of data leads to the need for data to be protected – and, at the same time, demand for “intelligent” preselected information and recommendations specific to the situation in question.

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A change in needs requires new product and service structures in the financial industry

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#### 4.1 Corporate Governance Based on Facts, Financial Indicators and Automated Recommendations for Action

Managing financial institutions as a business means that opportunities utilized in the organizational structure are more important than avoiding risks – throughout all levels of hierarchy and in all areas of work. It is necessary to remember this statement because the constitutive principles on which the financial industry are based have been shifting from those of relative stability to ones featuring a high impetus of change and a high degree of innovative intensity for a long time, and are continuing to do so. Consequently, management reaction times must be shortened.

Recognizing that a service has been positioned on the market incorrectly should lead to an immediate reaction. This presumes that decisions are able to be made based on defined parameters, which will ideally be predominantly automated in the future. By contrast, a service can be expanded more quickly if it has been successfully positioned on the market, which, in turn, presumes transparency in terms of statements that are, as far as possible, not open to interpretation, in order to allow for subsequent debates on distribution without damaging corporate or management culture.

#### 4.2 Utilization of Changed Structures of Competition

Competition and the rules involved change fundamentally but not completely. Price and performance, the optimized relationship of which (bar a few exceptions) is expressed as efficiency, remain key competitive factors as they constitute the means by which players in the market challenge competition. Financial institutions which primarily stay competitive through price due to the similarity of products, have to constantly improve efficiency through the use of technologies: both by means of direct technology costs as well as exploiting future potential, which can be achieved, for instance, by means of artificial intelligence with user friendliness (convenience and usability) as well as a modular set-up assuming an increasingly important role in the future (microservices and elasticity) especially in digital contexts. Products will be geared more strictly according to their electronic convenience rather than as a result of their direct benefit; the needs chain will gradually be extended through additional components – starting mainly with payment services and (virtual) account functionality, meaning that a modular set-up of services will become the norm with the user having plenty of opportunity to combine these services.

Major changes in terms of competition will stem from the recently emerging structural quality of an integrated availability of financial services in concrete contexts of use, which comprise platforms, networking and datafication. The ensuing patterns of reaction and solutions for financial institutions must be discussed with this in mind.

## Platforms

In digital ecosystems, platforms are the main way of accessing products and services for manufacturers and consumers alike (or other manufacturers in B2B businesses, Fig. 13). The fact that they have spread as a result of digitalization can be explained by means of technological progress; their triumphal march can be seen from a customer's perspective by the fact that it has become much easier to find offers as well as platforms gearing themselves strictly according to the context of operation (communication, purchasing, entertainment etc.). From the manufacturer's point of view, costs are falling in terms of sales and logistics (view excluding remanent costs).

Technology platforms provide the primary access to digital markets

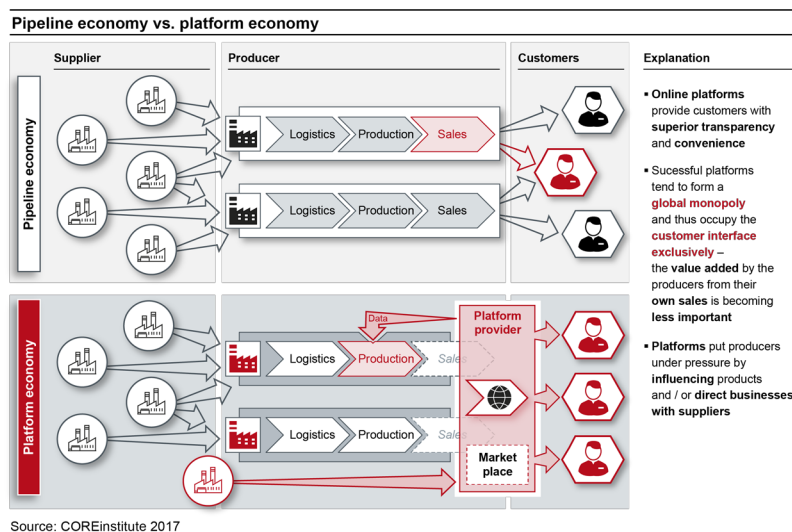


Fig. 13: Difference between the platform and the pipeline economy chain

As a result of the dominance of platforms as well as the utilization of concrete combinations of use, the question for financial institutions is no longer one of whether they use platforms but rather how these can be best used.

### › Cooperating with external platforms

Financial institutions are able to place their products and services on external providers' platforms or make them available to prospective customers by way of these platforms, e.g. comparison sites, special product platforms or embedded in other forms of interaction and transaction. In some parts at least, this goes hand in hand with a loss of sovereignty when it comes to exerting influence over direct sales. However, only in this way can various target groups definitely be reached, who would otherwise not be able to, or it would prove exceedingly difficult for them, to draw on these products and services. The ability to integrate these services into singular yet operating contexts across different industries also depends on this. In many cases, new internal structuring (further digitization) of products and services is needed in order to satisfy the requirements of the platforms and to be able place the products on these



platforms. This comprises, for example, the strict alignment with interface standards or the integral availability of data relevant to the services in question. From a tactical point of view, the focus must be directed towards further use, as widespread as possible, on an individual basis (leads, data etc.), as well as the ability to connect to other platforms at the same time.

#### › **Set-up of individual platforms**

Besides integrating products and services across the boundaries of traditional industries, the set-up of individual platforms requires alignment to the contexts of action on the part of users. Insofar as the products and services of financial service providers are usually geared towards offering support, the platform must allow for preempting the inclusion especially of financial services on non-financial horizons, in particular by adapting to the requirements of other industries in the B2B industry. Partnerships needed for the set-up may constitute “natural” cooperation – e.g. within cooperatives stemming from trade, the housing industry, banking – or in an alliance of interest-led representatives from different fields in order to establish, for instance, a platform for digital infrastructure topics.

#### Networking

Technical networking, i.e. the multiple connection of separate entities by means of a loose linkage, is the prerequisite for interaction in digital ecosystems. As a result, it leads to open communication and mutual usability of the units. Another indicator of networking is the fundamentally bidirectional relationship between the entities: They act as both the source and target of data and stimuli. The development of networking is, in principle, not a complete process, i.e. it is open to different options in terms of design and use in the future. As far as financial institutions are concerned, it is crucial to participate in the design of more complex ecosystems through means of integration and cooperation.

This involves laying a range of foundations: Technically speaking, an internal and external interface structure is required with open or standardized APIs (Application Programming Interfaces) for stakeholders. From an organizational perspective, different types of cooperation must be created, which not only comprises modularizing value creation but also the willingness to draw in other partners into this Economic Value Added (EVA), as well as outsourcing respective parts of the value creation.

#### Data

Nothing is immune from datafication – every transaction is recorded as data in digital ecosystems. Incidents – entities, events, workflows, as well as products, services and users – are extensively and almost completely transformed into data: Extensively in the sense that transformation concerns all incidents; completely because every incident is transferred into data without “leaving anything behind”, or anything which is available as data is incorporated into other operations.

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Everything is data –  
data is everything

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The promise at the root of this paradigm is the gigantic spread of the human-machine sphere of knowledge and abilities: They are placed on a new foundation as a result of data, which is principally co-developed for machines and can be analyzed (big data) and activated (artificial intelligence) in a new way using technology-based instruments. For financial institutions, this means that the entire scope of data, data management and data analytics can be developed and expanded to become a core area of business expertise.

Financial institutions' patterns of success to date stem from initially focusing less on overarching use cases and more on concrete effects and improvements, i.e. essentially on producing the measurability as well as the massive increase in speed whilst, at the same time, increasing the volume of data in order to make complex data available in real time – geared towards customers, regulatory authorities and internal decision-making bodies: Consequently, the ability to react instantly must be secured in the form of comprehensive IT architecture. Local data management structures are the future of IT architecture, but homogenous access to these heterogenous data pools must be secured.

From a technological point of view, the ongoing development of existing warehouse approaches with new technologies is required, such as graphic-geared databases or shared analytical function clusters using in-memory technology in order to develop systems capable of learning. These technologies must be in a position to share data pools by means of separate (virtualized) servers and datacenters in order to be largely scalable. As regards analytic dimensions, complexity is increasingly bundled at the backend, such as the provision of data in order to provide the user (the machine in the case of artificial intelligence) with greater convenience and to let them have more complex inquiries (“Theorize by means of xy”); a good example from real life is Amazon’s Echo, which is able to process non-trivial everyday language of voice commands concerning household items and vehicles. The fact that the two main rivals, Google and Apple, have felt obliged to follow, shows how important the development is. It must be understood that it is increasingly necessary to abstract from the backend for the concrete initiation of analytics in order to be able to provide analytic statements. It should also be noted that this development has led to the paradigms for IT architectures and services for core banking systems, which have been in place for 15 years, becoming obsolete. Consequently, investments made in major ultra-complex integrated systems such as ZVKK/SAP, OSPlus (and OSPlus\_neo) and agree2, the three pillars in the German financial industry, are to be subject to a strategic reevaluation.

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Complexity will be bundled in  
backend systems in the future

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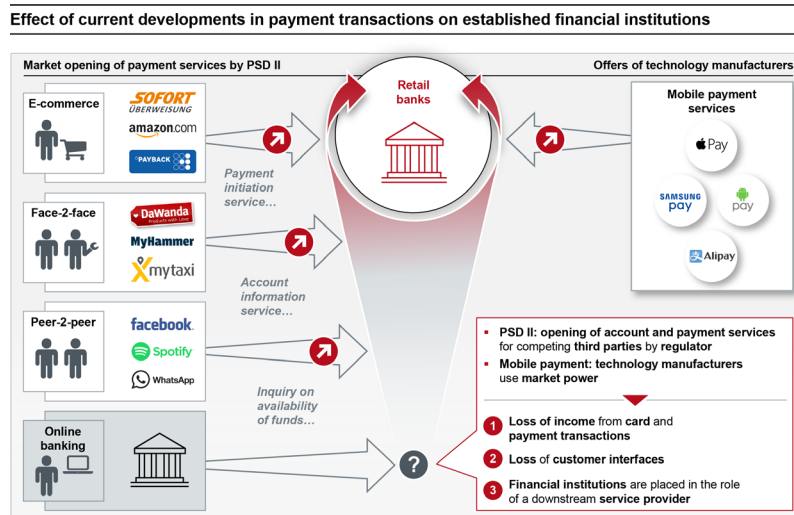
As a result, the financial institutions develop the ability to orientate and manage in ecosystems with the help of data. It is more a question of managing and optimizing products, product development, sales, customer service, enterprises etc. by means of data rather than setting up new data-driven business models. This will also make other analytic and steering dimensions available which will play a more dominant role in the algorithmics and heuristics of artificial intelligence, whether it be a case of assistance/automation, pre-selection of decision parameters or more complex artificial intelligence functionality of decision-making and creativity.

### 4.3 Adapting and Adding to the Product Canon for Digital Ecosystems

Digital ecosystems lead to a change in the material requirements, as articulated by customers and users, e.g. in mobile areas or concerning the private sphere and security by means of the change in the structures of competition. This partly affects rehashing established solutions as a result of amended digital requirements; in some instances completely new product concepts are initiated.

#### Global Payment Solutions within the “Internet of Things”

The disruptive force of structural change affecting the financial industry has manifested itself over the past few years in the area of payments in particular. Fintechs have made progress, especially where gaps have been left open by financial institutions which have either not developed online business or only half-heartedly, or they have disregarded essential areas of convenience innovation, e.g. the length of time for money transfers in selected regions. In early 2017, Concardis - a company jointly set up by the German banking industry was sold to financial investors. It remains to be seen whether the visibly strategic investment made by BAIN Capital and Advent Partners – following the integration of RatePay as the next step – will lead to the withdrawal of substantial flows of yields from the financial industry’s payment segments in the medium term, or whether there will be a classic re-use of future obsolete market structures as experienced in other industries in the arbitrage of falling volumes of business. This development is not yet complete, and the debates on the current state of RTS show what dynamic force is to be assumed in the pending PSD II-based roll-outs by established market players, fintechs and platform operators.



Source: COREInstitute 2017

Fig. 14: Regulatory intervention as a driver of innovation in the payments market

At the same time, the regulator has enthusiastically pushed forward the liberalization of the market for payment services throughout Europe and standardized the European market, limitation of price models, introduction

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of security standards as well as the opening of functions and data even for technology-driven market participants outside of the industry by means of the provisions governing PSD, SEPA, MiF, MaSI, PSD II, BAIT and instant payments. As a result, a heterogeneous payments market will ensue with immense variety and a continually high momentum, in which even alleged market leaders such as PayPal are likely to be pushed into the background. This momentum is currently being strengthened by the increasing activities on the part of technology companies aimed at putting their own payment solutions in place (Fig. 14).

Management is faced with two dimensions for compulsory action: a) profitable handling of discontinuing established solutions and infrastructures wherever possible as well as b) targeted exploitation of opportunities. Financial institutions have the opportunity to develop payment transaction systems for the “Internet of Things”. There is a whole host of applications in the consumer segment for integrated payment, e.g. smart home and smart city as well as the “Connected Car”. One such example is Uber, the use of which does not require any payment authorization for transfers. As far as “Industry 4.0” is concerned, there are a lot of application opportunities for integrated payments in the B2B industry, for example, M2M payments (machine-to-machine). These future scenarios are based on payments taking place in structurally networked environments being generally straightforward and completely integrated, i.e. manual intervention is not required. This gives financial institutions the chance to establish integrated payment platforms based on data for diverse contexts concerning handling and usage, and, hence, to formulate a relevant reply concerning the convergence of man and machine in this field.

### Private Data Management

Security and trust represent a concurrent yet integral factor in digital environments as shown by attacks and blackmail in the form of direct hacks as well as social engineering, manipulation of democratic elections by interested parties and massive damage caused to businesses. The number of cyber attacks has risen globally – almost threefold – from 24.9 million cases recorded in 2012 to an estimated 73.9 million in 2016 (Fig. 15). This is related to the massive, direct and indirect consequential damage recorded by business. The awareness of the need for security in different areas by private internet users is pronounced, at least in Germany. A survey recently carried out by the Federal Office of Statistics found that 78% of users try to protect their personal details when using the internet.

Documents released by Edward Snowden as well as the ones recently published as part of the Vault 7 scandal show how gaps can be systematically utilized. This is not to reveal security risks and to eliminate them, but rather for state institutions to use them for spying and manipulation purposes. Digital ecosystems must be considered as structurally insecure for the time being – and the state is involved, with all the conflicting consequences, for a free and democratic constitution associated with it.

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Digital ecosystems are structurally unsafe for the time being

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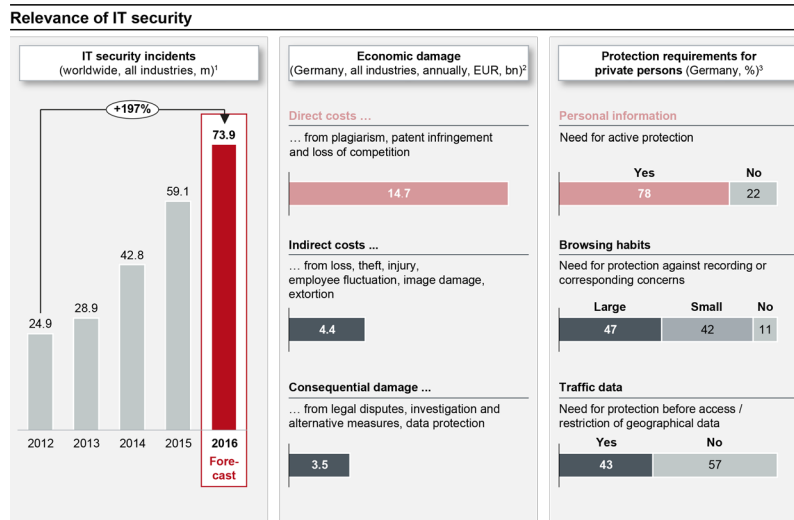


Fig. 15: Security and its relevance

As a result of the historical aspect, in addition to the continued trust and the demands placed on financial institutions for quality of customers' data as a means of avoiding money laundering, they are in an ideal starting place – in spite of the financial crisis – to position themselves on the market with innovative services based on security, identity and trust services for digital ecosystems. Financial institutions are able to address corresponding needs by providing, for example, private data management, especially for areas requiring a high level of protection such as identity, health and wealth. Financial institutions could formulate proposals here which have a dual function: protecting and safeguarding data on the one hand, and, making them available on all channels to those authorized to access them, on the other, meaning that these can be utilized according to the context in question and with close involvement by the owners and users of the data.

Make active use of the high degree of trust in financial institutions

The eIDAS Regulation, which regulates electronic identification and trust services for electronic transactions between persons within the European internal market, is prevailing in terms of services involving identity and trust, i.e. not involving interaction and communication with and between machines. The regulation aims to strengthen people's trust in the online environment in economic, social, and public administrative contexts, to increase the legal compliance of those involved and, therefore, to encourage the use of innovations. The data privacy basic regulation and the future ePrivacy Regulation must also be taken into account, even if they depict a competitive advantage on a global scale for the European Economic Area.

In this respect, financial institutions can formulate offers and play a major role in interaction and transaction in digital environments through services in the context of digital identity and digital trust. They are able to guarantee data security in terms of confidentiality, integrity, authenticity and availability, i.e. prevent misuse and identity change. At the same time, they give users opportunities to interact trustfully in pure digital environments with secured identities. Design principles in this context are "security by design" and "privacy by design"; The eIDAS and data privacy basic regulation both

A variety of identity services are needed in positions of trust in the future

define four levels of protection by means of technical guidelines, so-called “levels of assurance, LoA” (Fig. 16), meaning a secure legal framework is provided within which the playing rules are redefined for the market.

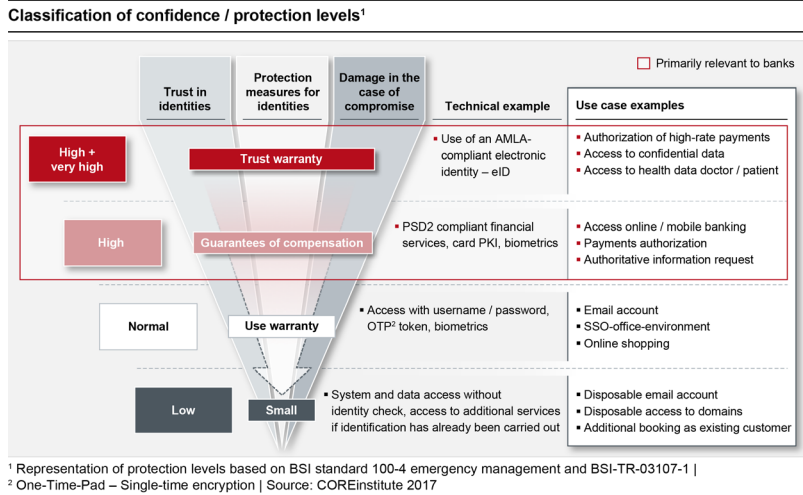


Fig. 16: Varied level of trust and protection

Similar potential for services is also available for wealth, health and individual transaction data. Here, too, data security must be guaranteed extensively on the one hand. On the other, data can be made available to the person who owns it or those who have been granted access rights. This means that users would regain a high degree of control while extending possible uses at the same time.

### Smart Contract Management

In terms of managing contracts, digitalization is, for the main part, still in its infancy: It has reached a stage whereby analog data is transformed into digital formats. The ability to have an overall view of personal contracts or uniform management approaches have only been developed to a small extent. Processes are neither supported at the level of individual contracts such as initiation, conclusion, management, terminating, tracking – nor at the level of multi-contract management – e.g. comparison, assessment, harmonization.

Certain insurance companies outside the financial sector have made initial attempts, which have also been inspired as a result of InsureTechs; to date, banks have been focusing on storage functions such as an electronic safe, e.g. UBS or Deutsche Bank. In actual fact, there is, however, likely to be a dramatic rise in the cases of application for intelligent contract management as a result of the expected growth of contractual negotiations and agreements in the “Internet of Things”. Financial institutions have no end of opportunities to be able to address current and future needs with innovative services as a result of the trust that their customers have in them as well as their technical expertise.

The stepping stone for tapping into this new business activity is having sovereign control over blockchain technologies as well as an overarching standardization, at least in the financial sector.

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## Integrated Advice

It is a pattern in developing the market of financial services that aggregating information, the inclusion of other sources and the advisory services associated with it have been initially provided by services outside of this industry (Check24, Interhyp). This range of services is becoming increasingly positioned in the market using technology and is showing signs of dynamic growth, partially against the embittered opposition by financial institutions or their associations. The institutions' own advisory services, on the other hand, are more inclined to sell the product portfolio provided by the financial institutions themselves or those which are placed as exclusive services, especially wealth management/private banking. Nevertheless, financial institutions can now bring about added value with comparably little effort by means of networking and drawing on data. A platform approach is used in order to keep market players at bay. Concepts for these value-added services can be found by analyzing advisory approaches used in other markets.

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Technology-based value-added services to have more weighting in product management

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A value-added service can be used to make cost structures transparent, e.g. household consumption charges, against the background of assessing comparative data/benchmarks and suggesting alternative solutions. At the moment comparison websites like Check24 are offering this kind of service which make suggestions based on manual input. On the other hand, financial institutions could also bring about transparency to the situation in the first instance or periodically using the smart data management described above, in order to optimize customer-specific contracts according to certain aspects. Another value-added service can be the pre-posting of information relevant to tax. Even the compilation of possible courses for action concerning, for instance, investments across industries, can bring about added value – this is currently offered by independent asset managers, or by financing platforms in other segments.

Another field of value-added services is optimizing business models and in risk classification. Financial institutions have the data required, methods of risk assessment as well as access to the relevant markets. Whereas customers generally resort to management consultants for this kind of information, this method of giving advice to start-ups as well as optimizing companies can be provided by banks as a value-added service. In specialized fields with doctors and on the peripheries of medical care establishments, for instance, this is already the case by means of specialized providers.

In order to utilize these value-added services, financial institutions will have to make strict use of data and data analytics at the same time as developing the capabilities of artificial intelligence based on extensive networking. This requires financial institutions changing, both in terms of expertise in technology as well as culture, such as by setting up data management and data scientist teams. Financial institutions will then be able to succeed in substituting advisory services provided by third parties by providing their own profitable value-added services.

#### 4.4 Agilization of Organization and Governance

One of the key success patterns in the ongoing organizational development of financial institutions is a more intensive interweaving of business and IT. Industry and technological experts can formulate strategic corporate goals together. Partnership models must be applied across different sectors and geared towards agility and using more recently developed management concepts, e.g. shared leadership, in order to increase the degree of implementation in face of a high momentum of change and less pre-structured scopes for solutions.

Technical expertise and IT development based on occasions, but only when well integrated

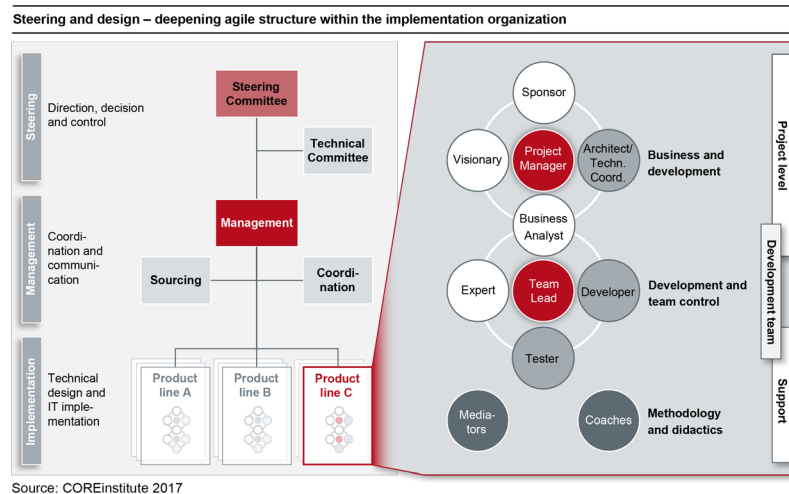


Fig. 17: Dual Governance

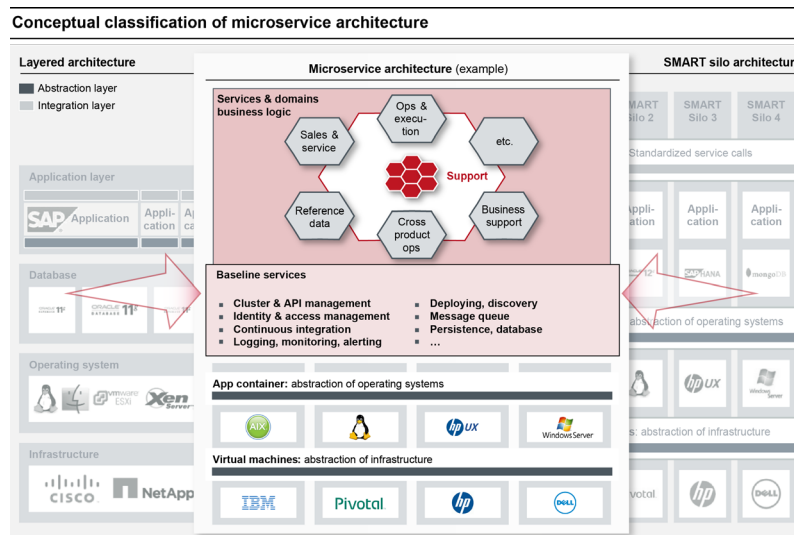
Procedural models have been developed in agile contexts which are based on, for instance, dual governance (Fig. 17): Baselines can be set out together with senior management in somewhat classic structures as well as project contents and business focuses harmonized, whilst implementation encourages agility and focuses on operational management issues. This method of dual governance enables creative potential to be released for developing and providing market services, on the one hand, and, on the other, to also include overarching outlooks of necessary group control functions, such as legal, compliance or financial control by recognizing responsibility.

#### 4.5 Technological Expertise and Process Control

Digital environments require a high degree of flexibility and the ability to implement, which presupposes an adequate technological base as well as agile, procedural competence. The leitmotif should be to tap into the potential pivoted in technologies towards both efficiency (costs, speed) as well as products and services (innovation) – at the same time, technologies are not an end in itself, meaning that they should be implemented as a prerequisite for a general ability to act without any concrete reference. The use of new technologies and corresponding modernization projects are to be geared towards benefit effects. This may not only be use cases for new products but also effects such as the increase in speed in the context of data analyses and their automation. Points of contact can be created from them and other indirect developments initiated.



Micro-service architectures realize encapsulated IT services and allow a sufficiently high degree of modularization (Fig. 18). Central and widely spread interface technologies such as http/s and RESTful API (Application Programming Interface) guarantee communication between the services, especially regarding external communication. As queries are, in fact, limited in terms of their complexity due to structures of the interfaces, the complexity to be managed is gradually made more controllable as a side step. The success of these communication structures also has an impact on the internal communication of services, which are roughly equal to external patterns. Data architectures, in particular, require – irrespective of whether it is centrally or locally managed – organized data pooling with comprehensive technical interfaces in order to incorporate specific BI and analysis tools and build up expertise on the one hand, and, on the other, to establish comprehensive data governance with powers of self-assertion.



Source: COREInstitute 2017

Fig. 18: Microservice Architecture

Cloud technology, i.e. drawing on services via the internet, has progressed to become the norm in the market for IT infrastructure services (e.g. storage space as well as obtaining software). Digital ecosystems require automated, adaptive and flexible environments. The framework conditions in terms of regulatory and security aspects have been created especially for the financial industry (besides general regulations such as BSI requirements catalog for Cloud Computing and the Fraunhofer AISEC); solarisBank as well as N26 pursue cloud-based operating models. Hybrid or virtual private cloud represent possible models for financial institutions in everyday practice which are to be pursued in addition to the established outsourcing structures.

The same applies to the use of blockchain as a technology for distributed ledger, which ensures the ability to undertake transactions in highly complex environments without the need for central entities to become involved. Its application options are currently being developed in various areas,

Make broad use of  
microservice architectures

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and are most prominently represented by cryptocurrencies like Bitcoin; Future opportunities include, for example, smart contracts, notary services or eGovernment solutions. The foundations of technologies to be made available here nevertheless need an elementary understanding of security requirements, the correct implementation of them and the mastering of extensive cryptography and the use of consensual algorithms.

Technological competence must therefore be enhanced at all levels of hierarchy. This will encourage the use of technological methods to bring about solutions and principles, even for technical situations and concepts and, at the same time, also to raise the decision-making capability for these concepts. Another factor in ensuring performance-related decisions is gearing the organization and work of committees towards operational implementation. It may be expedient to establish policies geared strictly towards agile paradigms and to let them face competition against those already present on the market, in order to overcome limiting provisions from regulations. Basically, placebo measures in parts of the organization should be identified at an early stage and eliminated.

#### 4.6 Revising Sourcing Structures

When looking at how ecosystems are organized, financial institutions can – quasi on the assets side – determine their own services and integrate these services as an added value in the comprehensive ecosystem. The various dimensions of use for the customer should mainly be included here: The users' concrete topics serve as reference points on the one hand – e.g. communication or entertainment – in order to gear their services along the entire points of contact used by the customer. Vice versa, the spheres of benefit for their own services – such as finance or wealth – can, on the other hand, serve as reference points in order to hook up further elements, from third-party service providers, too. As regards liabilities, the structure of the ecosystem consists of cooperating with sourcing partners in order to integrate services flexibly depending on the topic or strategic direction. The changes which have come about over the past few years have not resulted in breaking down rigid, non-marketable supply structures.

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Asset and liability side of digital ecosystems to be organized

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Consequently, the continual development of supplier structures are needed in the future. These must be reorganized as flexible pools of experts focused on competence. This implies a greater avoidance of long-term production contracts with larger organizations such as IBM, HP, Accenture and offshore factories like TCS, Cognizant, Infosys; the same applies to freelancer pooling such as Hays, GFT or Allgeier which focuses on costs. At the same time, internal IT supply structures must be assessed much more critically in terms of efficiency and innovation aspects as these will be in direct competition to services offered by technology providers in the future.

Accelerating the needs-based use of experts is not seen to be critical. Their deployment is to be accompanied by tried and trusted methods from other industries which shape development and supply partnerships by means of varied role models in order to balance out the individual goals specifically – flexibility, innovation and cost efficiency. This means making more use of bonus and penalty mechanisms and assuming management responsibility.

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#### 4.7 Organization of Legal and Ethical Frameworks for Fair Competition

Financial institutions can have a positive impact on an economically inspired set-up of structural security and trust concepts by co-shaping the political and social framework. Thus the regulator and financial institutions can, together, succeed in structuring relevant parts of the digital ecosystems, developing the norms for stable and liberal markets and protecting the consumers.

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Co-design standards of competition for stable and liberal markets

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##### Data Protection and Customers

Future ecosystems rely on the collection, use and exchange of data. Consequently, financial institutions are forced to move away from their current policy of restrictive data usage and to establish themselves according to the amended rules of competition in close consultation with the regulator. This usage is, nevertheless, compliant on the basic right of protection of personal data and the principle of informational self-determination, in order to safeguard the trust and security for customers and business partners, even in digital environments.

The European General Data Protection Regulation (GDPR) sets out the definitive rules, in order to protect natural persons from the loss, destruction, amended or unauthorized disclosure of their data on the one hand; it aims to create legal compliance and transparency for economic, political and judicial actors in order not to limit the free traffic of personal data on the other. Currently – and as a rival to GDPR – drafts are being debated for the future ePrivacy Regulation, by which means identity issues are intended to be regulated, particularly concerning the browser and internet access – with partial, huge impact on the business models of the media.

Following the massive loss in trust that financial institutions experienced as a result of the financial crisis in 2008, they can extend the level of trust for their customers and develop norms together with representatives from other sectors and industries. In terms of organization, this concerns, for example, the implementation of specific basic principles such as data minimization, integrity and confidentiality of data processing as well as transparency and accountability, not only to the regulatory authorities but most especially towards customers. The ultimate level of protection can be achieved from a technical aspect. Based on this security and protection of customer data, banks can ultimately realize a use case-based provision of data in order to make use of this in a variety of ways.

##### Regulatory Intervention and Monitoring Aspects

Financial institutions are faced with the same amount of regulatory provisions and monitoring practices by supervisory bodies, which will continue to remain extensive and complex for the foreseeable future (see Fig. 6 above). However, most of the regulations are also tools for technological innovations which are shown, for example, by the acceleration of APIs as a result of PSD II or in instant ability required in the future, e.g. in the payments segment in order to stabilize the financial markets, market liberalization and consumer protection.

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Regulatory intervention means innovation

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On the one hand, financial institutions have pushed forward their technological modernization over the past years. On the other hand, an amended level of ambition in the use of technologies emerges as a result of technology companies. Both financial institutions and regulators must react to this, since technology companies have more or less been able to act largely unrestricted to date. As a result, the growing technological possibilities must be accompanied in a selective way by the regulator, especially concerning electronic identity (eID), data management, cloud, cognitive computing/artificial intelligence, security (resilience, biometry) and blockchain. From an organizational and institutional aspect, the parallel set-up of competence in mathematics, computer science, science and technology must be encouraged in conjunction with agility, and integrated into business and IT strategies.

### Infrastructure and Security

Reliability and the security of network and information systems are integral infrastructural factors for basic and advanced functions within digital ecosystems and thus increasingly associated with economic prosperity. The financial industry ensures the operation and functioning of vital infrastructure, which other business sectors draw on. In face of the increasing dominance and the monopolistic position played by US and Chinese technology companies, it is becoming virulent that regulation implies the existence of critical infrastructures – this means taking responsibility for one's own, marketable IT.

Regulatory provisions such as eIDAS, GDPR and PSD II mentioned above, in addition to the national IT Security Act and the European Directive on Security of Network and Information Systems, promote the idea of a uniform vital IT finance structure, by which means financial institutions provide all economic participants with a joint infrastructure and defined basic services. Alongside security requirements, for example, the NIS Directive comprises the set-up of a reporting system centrally for the operators of major services to report on incidents and risks. In this respect, financial institutions are able to take on a co-organizational role and act as a component for security and trust services. By assuming the responsibility for this critical infrastructure, financial institutions can further distinguish themselves in their digital role and establish themselves as guarantor for the security and functioning of a digital monetary economy.

## 5 Recommendation

Today, the challenges facing the management of financial institutions are no less diverse than they were in the past; there will, however, most probably be a shift in the focus of activities. The sophisticated distinction, which used to be much less and is now more apparent compared to other industries or business models, will be increasingly offset and widely accessible by means of the penetrating use of technology. The challenges faced by industries are the same as the ones facing politics and society: Will politics develop perspectives for the future, which are geared more towards the largest rather than the smallest common denominator? Will the state gain speed in order to fulfill its management mandate in an increasingly globalized world? Will education – and with it, educational policy – learn how to cope with a digital educational canon; will people involved in the educational system accept their changing role, from a single source of knowledge to one which coordinates the development of knowledge?

The choice of topics in these segments shows that it will be easier for the financial industry, given the general framework – as in the many centuries beforehand – to find answers to the recurring challenges initiated by industry. The scope for intellectual and economic leadership must be organized in order to be able to incorporate the potential for financial institutions to take a more constructive stance on pending social debates than they have done in the recent past. Only in this way can the trust in the organizational power and risk management of financial institutions be reactivated in order to find their way back to restored strength in the new paradigms of our era. Viewed from an international aspect, these efforts can be observed in Asia, most especially in the USA, and in parts of Europe. We see the same efforts initiated by the first financial institutions in the German banking industry.

We have attempted to analyze some aspects of an ever quickening and changing environment and will now summarize our recommendations below in seven main points:

- › **Gearing the management of institutions more strictly toward the efficiency indicators of corporate governance** in order to expand organizational and technological room to maneuver in existing and target markets more forcefully than before on the basis of digital ecosystems.
- › **Identifying and actively utilizing new competition structures** in order to effectively defend existing profit pools and participate in new ones in the future.
- › **Supplementing product canons with financial, security and trust services for digital ecosystems and critical infrastructures** on the basis of the Web economy in order to sustainably and profitably embed these services as digital added value on their own and third-party platforms.
- › **More agile management across all levels of the organization's hierarchy** in order to be able to respond more quickly to any identified negative or positive business developments; this will result in a greater and more preventative effect in the future to ensure the sustainable success of the institutions.

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7 main topics on the agenda of executive management

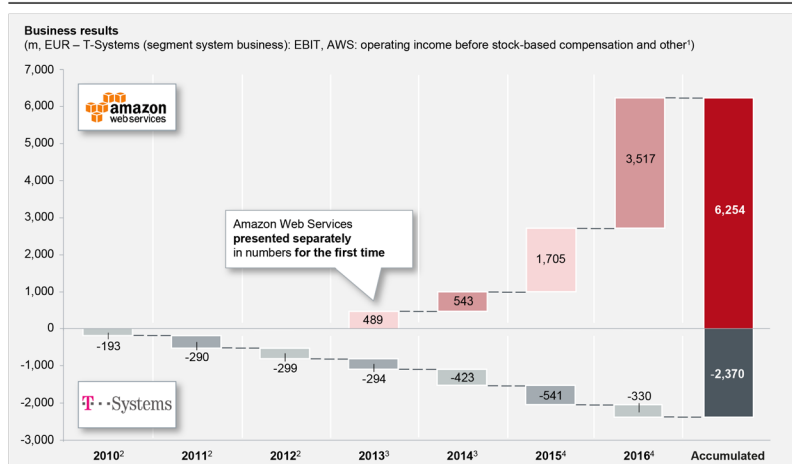
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- **Building up current technological expertise** in order to successfully tap in to technologies and organizational forms. This goes hand in hand with a vigorous reduction of technological and organizational legacy with a view to establishing room to maneuver for business developments in recognized sectors and expanding newly developed lines of business.
- **Breaking down existing sourcing structures and designing new ones** to indirectly safeguard internal efficiency efforts and to achieve greater independence from vendors.
- **Active and cooperative approach to devising the legal and ethical standards governing digital ecosystems** with a focus on a European set of values in order to be able to operate successfully against global competitors using battle-hardened mechanisms.

We see that challenges faced by fintechs have been mastered confidently. Focusing on the services offered by these fintechs no longer appear the norm, at least no longer than the customary observation of the competition. Forged partnerships have secured the existence of some candidates, but have, however, made them dependent on others, which are contrary to the often excessive expectations of investors, who will then allocate capital flows elsewhere in the future; other providers have been pushed to the perimeter, many are close to winding up. This trend has already taken hold and can be seen clearly in the figures of declining investments in fintechs in the USA.

Challenge posed by fintechs has been mastered well

Profit development of Amazon Web Services vs. T-Systems



<sup>1</sup> Amazon annual report; currency converted | <sup>2</sup> Deutsche Telekom annual report 2012 | <sup>3</sup> Deutsche Telekom annual report 2014 | <sup>4</sup> Deutsche Telekom annual report 2016 | The effects of changes in the calculation bases between the annual reports of Deutsche Telekom are not consolidated – lower absolute values in case of conflict

Fig. 19: Amazon Web Services AWS vs T-Systems of the German Telecom

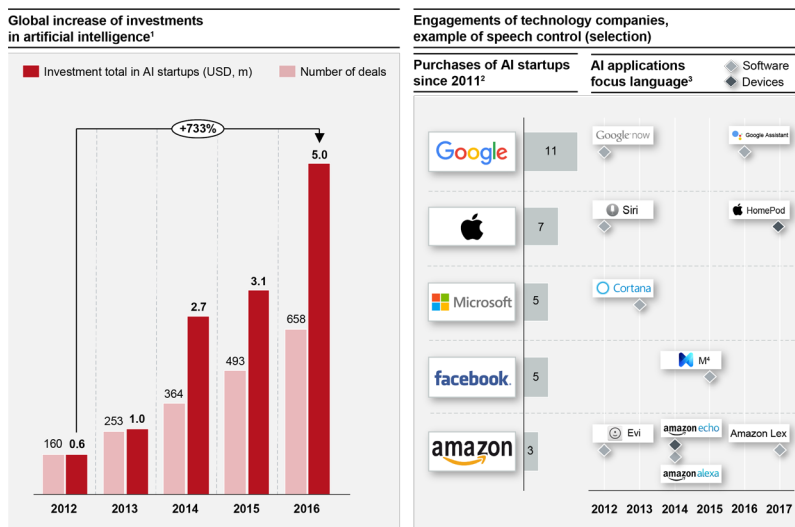
After taking more agile management paradigms into account, this finding can be translated as a pattern of behavior in order to be able to use the latency of market developments positively. The efficacy of precise analyses and swift reactions can have both a positive and negative impact: negative as seen with the subprime mortgage crisis; an obvious situation in the USA, perceived in Europe, but management action was taken too late, meaning that there was devastation in the balance sheets without any need; ten years on the situation is still not completely over. Positive in the sense of

coordinating fraud defense; European banks are acting at a highly organized and technological level across all spheres and are using analyses and speed of decisions to establish lowest possible claims ratios throughout the world.

We see the challenge in the ever-quicken pace of adapting technological development (Fig. 19). The patterns of success in structuring efficiency seen to date through technological progress will, in future, most probably only have a marginal effect. This has been understood in theory by the strategic departments, but has, however, not yet been implemented by management. The fact is that financial institutions have been trained for years in only one cause, namely efficiency gains are achieved by means of consolidating business, which is anchored in management culture across all industries.

The ability of financial institutions to embrace innovation has been impaired by this management culture. This has, to a large extent, caused the hype surrounding fintechs, as substantially no new products or channels have been developed – the only thing has been a faster access to technological opportunities and potential generated by capital. Organization of capital is the core competence of financial institutions, whereby building up latest expertise in technology represents the contemporary and absolute essential task critical to success for management and regulatory bodies.

Combination of capital strength and technological expertise as a new paradigm



<sup>1</sup> Source: CB Insights 2017 | <sup>2</sup> Source: Handelsblatt 2017 | <sup>3</sup> Source: COREInstitute 2017 | <sup>4</sup> Control of the digital assistant "M" via chat in Facebook Messenger

Fig. 20: Artificial intelligence as a field of growth and innovation

As an example, the pioneering field of innovation known as artificial intelligence, which holds out the prospect of fantastic growth rates. Investments, especially in artificial intelligence start-ups more than tripled in 2016 in comparison with 2012 (Fig. 20). Technology platform providers, too, have been actively engaged in this field for many years now. Through acquisitions, they integrate technologies and the know-how associated with them, and thus, at the same time, tap into diverse possible benefits of artificial intelligence, currently in particular features associated with language, such as translating and management based on natural language.

Another horizon for observing potential and relevant business risks is the pending contention concerning customer points of contact with technology platform providers. Insofar as requirements stemming from technological development are not mastered, customer interfaces not successfully defended, and any newly emerging markets not developed with new performance promises, it is very likely that potential earnings in the finance world will, sooner or later, be explored to satisfy the annual growth goals of technology platform providers.

The vision of banks to provide technology platforms is both attractive and ambitious: Based on their inherent capital strength and the competence in technology required in the future, financial institutions may act as guarantor for the security of digital goods and values in a globally digitalized world. Besides ensuring the security of monetary transactions, asset management and bank business, we see potential in the future in the position of trust concerning data and identities associated with strict neutrality compared to both technology enterprises and the state.



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**Holger Friedrich** is a Managing Director at CORE. He was previously employed in executive positions in technology companies and management consultants. He has many years of international consulting experience in the technology and banking sectors. The main areas of his work are IT transformation management for banks and financial service providers. He is in charge of management consulting activities at CORE.

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Holger Friedrich

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Dr. Mirko Schiefelbein

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## About the COREinstitute

The COREinstitute is a think tank for investigating the systematics of technologically driven transformations in industries with a high proportion/degree of IT involved in the value creation process. The cause and effect mechanisms of complex IT transformations are analyzed and possible solutions are developed together with decision-makers from industry, politics and science, in order to shape the change caused by technology.

As part of our mandate as an independent research institute, we prepare scientifically backed findings to specific questions asked by our clients. Furthermore, we make available to a broader section of the public selected results of our interdisciplinary research in the form of comprehensive publications, case studies and lectures.



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