

TRANSFORMING THE CORE

Splendor and Misery of the Inevitable

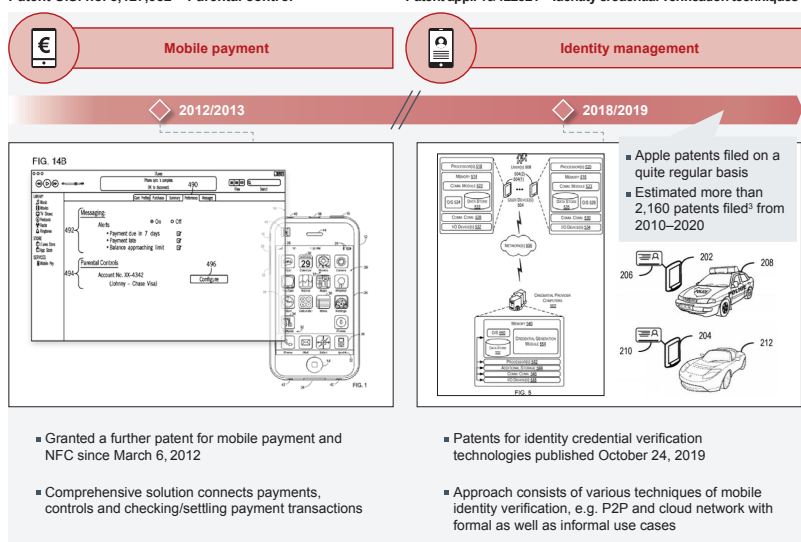
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Current functional, regulatory, and technological requirements will remain feasible within the institutions' system architectures. Despite all efforts to the contrary, the operational complexity of financial target operating models (TOMs) is increasing, as the technological sedimentation of the past in back-end systems and rapid technological evolution will make it difficult for institutions to master the three critical factors of IT: function, time, and budget. As a result, the technological and strategic issues of institutions' IT architecture design will be raised again more vehemently in terms of being able to withstand the market and regulatory pressure in the future.

Current requirements enforce discussion and alignment to back-end systems

Patent U.S. no. 8.127.982 – Parental control¹

Patent appl. 16/122321 – Identity credential verification techniques²



Source: 1. United States Patent and Trademark Office 2012 | 2. United States Patent and Trademark Office 2018 | 3. IFI CLAIMS Patent Services 2019, companies with the most U.S. patents granted to them in 2018

But even in the optimistic scenario of prompt mitigation, it should be noted that insights from technological development will need to be incorporated much more quickly into the strategic discussions of governing bodies in the future. This is required to allow institutions to successfully counteract increasing multinational and global competition, as well as rivals with more efficient working methods.

This was published seven years ago and launched as a productive service in late 2014. It can be observed that in 2018—four years after market entry—two thirds of governing bodies in the banking sector have ignored this development, against the advice of most technology experts and a minority of payment transaction experts. Consequently, the power of reality has forced several institutions into urgent implementation projects with Apple Pay. And Apple just published a new patent for an “ID wallet” as shown in fig 1.

At the center of the technological discussion is the recurring question of updating back-end systems and core banking systems respectively. The structures of these systems have reached considerable levels of complexity in recent years, which is why the pressure to act continues to rise in terms of achieving comprehensive end-to-end (E2E) processes.

The market of providers for core banking systems (as a key part of the solution) is highly fragmented and is subject to the same market friction as the financial institutions themselves, which is why a solution from providers to the fundamental challenges of more efficient and, by necessity, E2E support processes cannot be expected in the foreseeable future. Indeed, an escalating conflict between financial institutions and providers over decreasing profit pools is more likely. Consequently, this potential solution will not offer an adequate impact in the foreseeable future. Without sufficient access to expertise, it will be difficult for governing bodies to determine whether measures to be decided upon are structurally useful, or whether they are merely actionists and will therefore have a placebo effect.

The solutions is more likely to emerge through a sharper differentiation of strategic, organizational, and technological requirements—accompanied by independent harmonization of business and strategic IT requirements and the development of new target operating models (TOMs) based on cutting-edge technological foundations with high degree of automation.

The technological basis and the organization of work should be gradually modernized more systematically. Highly standardized integration interfaces (APIs) should be instituted to deal with increasing specialization of market products and leverage the service ecosystem effectively to enable ever shorter technology lifecycles. This offers both cultural and technological support for modern ecosystem organizational structures, the design of which should be seen as more of an opportunity and less of a threat. It is expected that the mastery of both cultural and technological requirements will play a more crucial role in the future competitive environment.



<https://core.se/publications/white-papers>

2 The Status quo

The current situation for banks operating within the financial sector is mainly shaped by three factors:

- The multidimensional intensification of the competition among established financial institutions;
- The widely known maxim “software is eating the world,” which dates back to 2011;
- The radical change being witnessed in the provider market for core banking solutions

In order to draw sensible conclusions in terms of technical structure, especially for core banking systems of European financial institutions, it is necessary to understand effective power vectors in these three areas and to incorporate these vectors more quickly and effectively in the decision-making processes of operational management and governing bodies charged with oversight.

2.1 Multidimensional intensification of competition in established institutions

Financial institutions are facing less favorable underlying macroeconomic conditions. As a result of the financial crisis in August 2007, an unprecedented low interest rate policy was introduced that continues to cause sharp drops in profits in terms of both net interest income and net commission income.

Competitive pressure increases
—technological mastery is
simultaneously attack and defense
vector

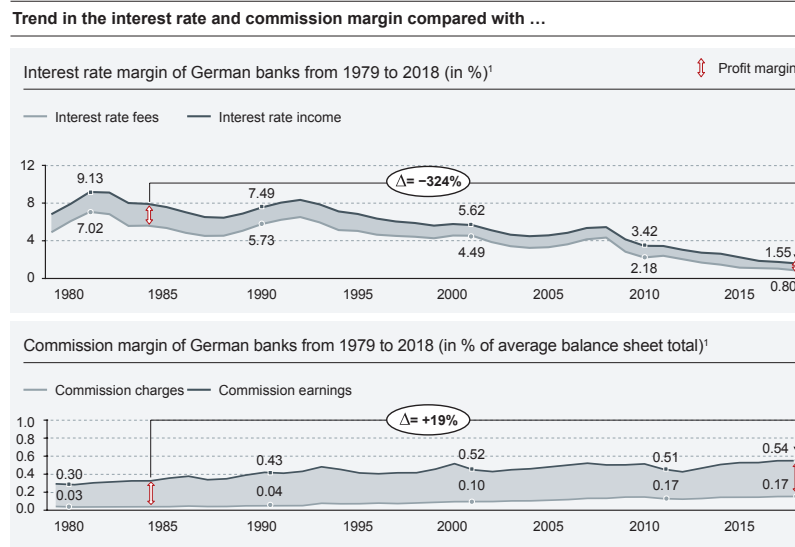


Fig. 2.1 – Analysis of potential business from 1980 to the present day

A considerable toughening up of supranational regulatory requirements, primarily aimed at financial market stability and the avoidance of excess risk (e.g. Basel III), but also explicitly at increasing competition (e.g. PSD2) have exacerbated the situation.

... administration, especially IT costs

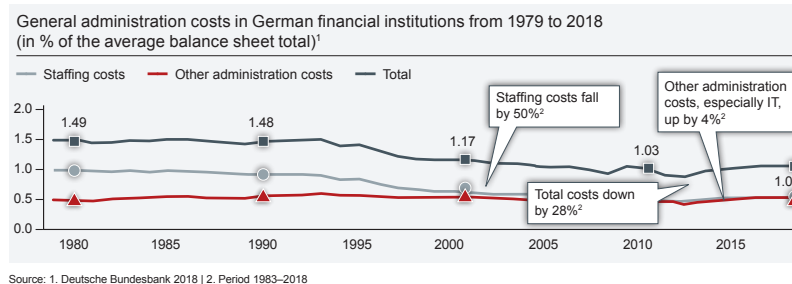


Fig. 2.2 – Trend in business costs, Including IT costs, from 1980 to the present day

Significant change in customer demands represents another factor that cannot be underestimated; among other things, this is driven by technological transformation such as increasing digitalization and mobilization in all aspects of everyday life. Self-determination, transparency, personalization, simplicity, speed, and a seamless transition between mobile, online, and offline are essential requirements, as are 24/7 availability and multichannel capability to meet all the customers' financial needs. These are no longer differentiating optional extras, but rather necessary hygiene factors for the continuation of active customer relations.

The combination of three factors constitute a tough challenge:

- underlying macroeconomic conditions and
- sustained high regulatory pressure, as well as
- increasing customer demands in terms of speed and simplicity of business transactions and the technical debts at many established financial institutions.

It is these same underlying conditions that are acting as significant catalysts for change while also allowing banks that are able to adapt to achieve disproportionate success in a short time. The axioms in this regard lie in the realization of cost benefits associated with technology (Moore's law, technology lifecycle management, cloud, container, DevOps, etc.) combined with shortened market entry cycles for the supply of functionalities that fulfill customer requirements. Consequently, financial service providers such as Revolut (UK) and N26 (DE) offer their account services at highly competitive prices in new markets, as the associated incremental IT costs are negligible (e.g. the issuing of a virtual card).

In the future, the success of banks will hinge increasingly on their reaction times

The frequent attempt to discredit these cost levels by arguing that they are based on huge amounts of debt capital does not, on closer inspection, hold water, as similar effects have been observed in sectors such as retail (competition between Otto and Zalando) and the media (The New York Times vs. The Wall Street Journal). This increasingly dynamic competition is no longer only found among the ranks of established banks or among the virulent FinTechs or RegTechs that have been around for some time but will increasingly come from digital providers with a global focus which started life as one-product firms but that are now moving into other sectors. Competition will also come from major platform providers that are encroaching on the value chain of financial institutions to offer banking services as complementary customer loyalty instruments.

2.2 “Software is eating the world”—sufficient expertise requirement for decision-makers in the financial sector

Coined by Marc Andreessen in 2011, the phrase “software is eating the world” also applies to the world of finance. This should come as no surprise, as financial transactions of all sizes and levels of complexity are ultimately IT transactions. Anything that can be automated is being automated. This is dictated by the rules of the market, which make more efficient structures appear more attractive from a customer standpoint. Furthermore, it is now harder to contain technical structures at a regional level, which gives supranational market players structural advantages over their national counterparts, which may also be fulfilling a political mission.

Nonetheless, more than 90% of current and savings accounts are held on IT systems whose origins date back to the 1970s to 1990s. Considering the exponential technological progress, these systems are unable to keep pace with the increasing functional and non-functional requirements resulting from incremental improvements.

If functional parameters in technological management, such as the costs and duration of provision, are factored into this consideration, the situation is clearly a negative one and permits the conclusion that, on its own, knowledge of the issues found within the complex world of finance is insufficient to ensure institutional success. Nevertheless, it is imperative that financial institutions build up greater knowledge of the field of technology, gain an understanding of the issues involved, and, ultimately, fully overhaul their technical nucleus. They must either evolve into modern-day software companies or focus on building competent business analysis and retained organization structures.

At the same time, technology enterprises—that currently have rudimentary understanding of the banking business—are starting to expand their value chains by means of automation, and in the process, encroach on the traditional sphere of the banks. The underlying motivations are manifold: data generation, ecosystem expansion, establishment of the lock-in effect, or a lack of adequate solutions on the market. Ultimately, this leads not only to a new competitive situation, but to a new market/customer group, too.

Increasing efficiency pressure arising from software development and more dynamic cycles of functional provision within ecosystems

2.3 Traditional core banking solution providers seem to lack funds or expertise to overhaul their products

The market of providers for core banking solutions is highly fragmented; structural differences in the business models of suppliers are significantly reducing the number of valid procurement options. Few of the traditional providers seem able to keep up with the technological development and the accelerated pace of change.

Core banking providers are becoming part of the problem rather than the solution

In the years immediately following the financial crisis (2008/2009), global sales figures for banking software solutions were down considerably until 2013; there was then a short-term rise of approx. 50% between 2014 and 2016, with far more contracts concluded. Since 2017, however, the market of providers for core banking solutions has undergone significant change. Alongside a decline (CAGR -5%) in global sales, full-service providers of the Sparkassengruppe (Finanz Informatik) and the Genossenschaftliche FinanzGruppe Volksbanken-Raiffeisenbanken (Fiducia

GAD, Sopra Financial Technologies) and the classic software providers (Avaloq, FIS, Temenos, SAP, SOPRA etc.) have been put under pressure by new market entrants: banking-as-a-service (BaaS) platform providers and API banks (Fidor, Solarisbank, etc.).

The latter do not (merely) provide core banking in the form of a system, but also position standardized interfaces (APIs) as a market service to facilitate access to transactional platforms for banking services. They additionally make it possible to make financial services available for non-banks. However, API banks do not represent a suitable sourcing option for core banking solutions for the majority of financial institutions.

Providers' market – trend and structure of core banking solutions

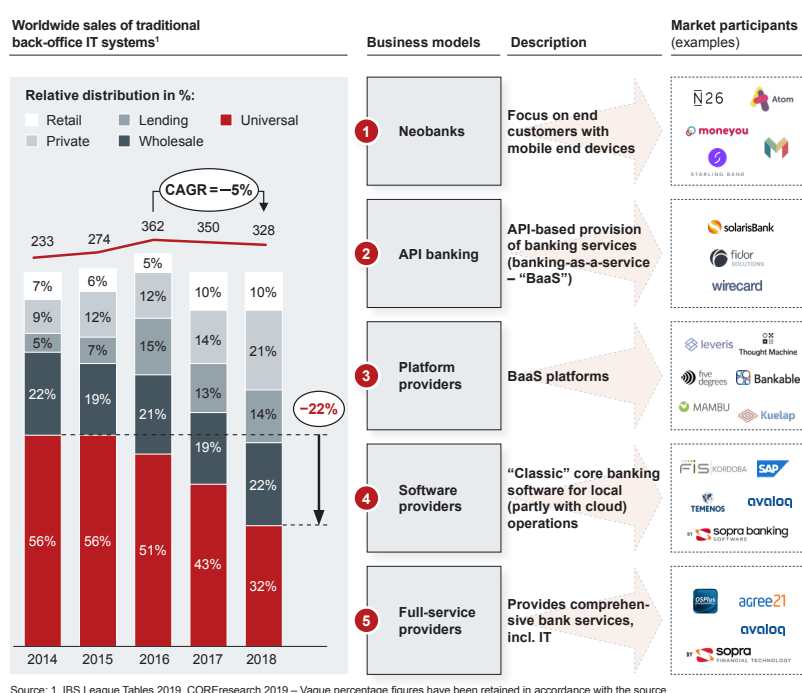


Fig. 3 – Market development for core banking system providers

Besides traditional providers, BaaS platforms (Mambu, Bankable, Kuelap, Thought Machine, etc.) are establishing themselves as a new market segment, offering completely new solutions based on new technological paradigms.

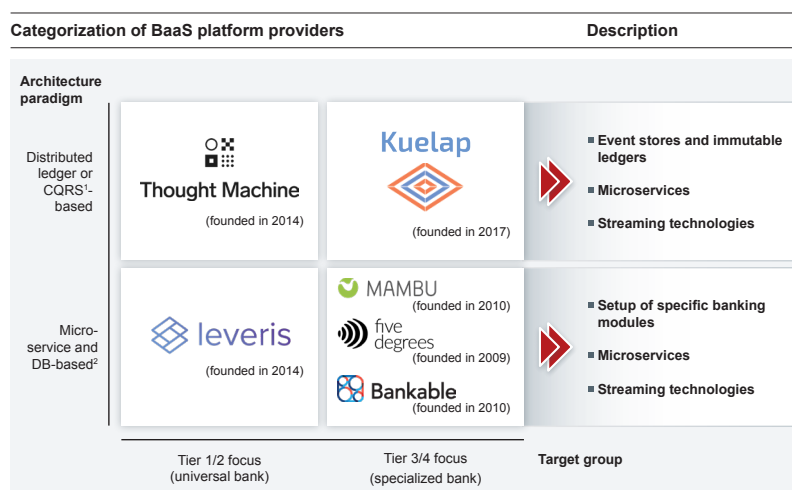
BaaS providers set new standards in terms of flexibility and efficiency

Essentially, these platform providers all follow the same six principles regarding their services:

1. Fully standardized software development processes with continuous integration and automated testing/deployment
2. Cloud-native software development and availability for use via cloud providers (Azure, AWS, Google, etc.)
3. Development of a standardized application core as a single code base with defined modification options, partly even with the possibility to develop smart contract
4. Customization options solely through configuration or the integration of external functions via standard APIs

5. Solutions with a high degree of specialization and technical modularization
6. Standardized integration of third-party products with the platform in order to expand the range of functions and establish digital ecosystems

The technological developments harnessed by BaaS platform providers result in attractive offers in terms of the total cost of ownership of these highly standardized functions (that are ultimately non-differential for financial institutions), even though the products and services still offer less functionality than those of “traditional” providers.



Source: COREresearch 2019 | 1. Command Query Responsibility Segregation | 2. Database

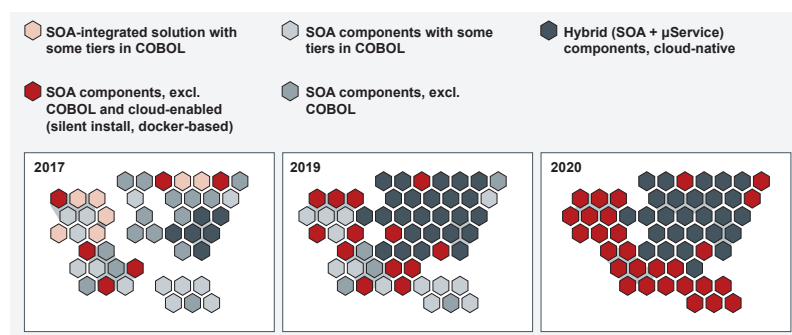
Fig. 4: Providers of core banking solutions in 2019

Due to the technologically feasible efficiency gains and evolving market expectations (cost reduction, greater flexibility, improved time to market, better integrability in digital ecosystems, etc.), these traditional providers are coming under pressure to act. As far as addressing the efficiency benefits of new market players and serving customer expectations are concerned, a fundamental technological “leap forward” is usually required from code bases dating back to the 1990s, i.e. new construction or fundamental re-factoring or reproduction of identical or similar functionality based on new technology. Otherwise, the products cannot remain competitive in the long term. Because this overhaul of the product portfolio must include current users through an upgrade path, significant investment is required.

Once the overhaul is announced, however, the number of new transactions regarding existing products may start to decline, whereas new products are still not available. As a result, a financing gap opens within the business model, as ongoing maintenance revenues are eaten up by the “expensive” installation base.

We see two market strategies for how traditional providers respond to the situation:

Modernization of the Sopra Banking Suite core banking system

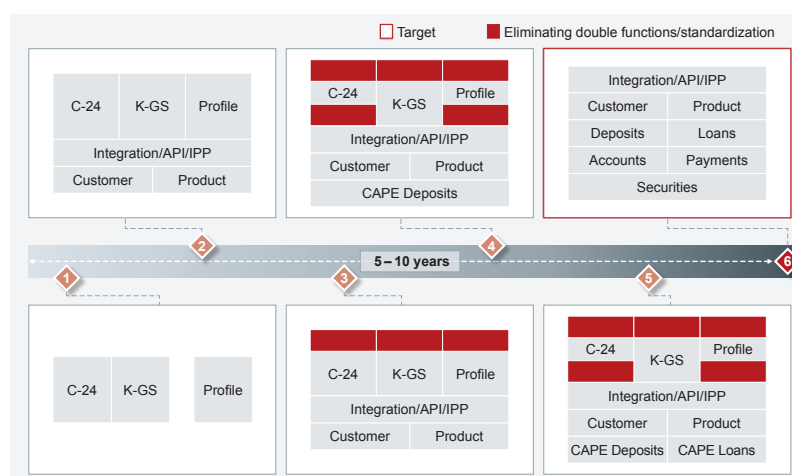


Source: COREresearch 2019

Fig. 5 – Migration roadmap for the Sopra Banking Suite

- › The development of new solutions/overhaul of old solutions is tackled using pilot customers who are prepared to help fund the project (e.g. SOPRA, Temenos, SAP). There are many other ways to close the funding gap, e.g. co-financing from other product lines in companies or through the involvement of private equity (as seen at Avaloq)
- › Providers buy in functions to preserve a greater functional range than that offered by the new BaaS platform providers (e.g. FIS, SAP)

FIS roadmap for Kordoba – transformation¹ in a 5 to 10-year period



Source: 1. FIS, presented in October 2017

Fig. 6 – Migration roadmap for the Kordoba Suite

Any financial institution looking for a new core banking system is faced with a challenging market situation:

1. It is uncertain which traditional software providers can successfully shape the conversion to a new technological base in the foreseeable future.
2. It is also unclear which of the new BaaS platform providers (and possibly API banks too) will be able to survive and thrive in the long term.
3. Full-service providers are either focusing solely on special customer groups or, due to their historically rooted technology basis, are faced with a need to carry out a technological overhaul.

Previous approaches taken by traditional core banking suppliers are increasingly becoming counterproductive for financial institutions

4. The ongoing evolution of the technology remains highly dynamic, meaning that portfolios of differing levels of sedimentation can already be identified among the BaaS platforms.
5. Due to the infiltration of providers from other sectors, hybrid offers with considerable scaling benefits are also to be found.

We are currently observing large financial institutions adopt different strategies when it comes to handling their legacy core banking solutions against the backdrop of the uncertainties outlined above. These range from

- full-scale propriety development based on latest technological paradigms (e.g. GS & JPM),
- business unit-specific solutions (e.g. ABN Amro, Bankable and solarisBank) and
- a combination of “traditional” solutions with highly innovative providers (e.g. Lloyds Bank).

In the following section, challenges and possible solution for core banking software providers and financial institutions are discussed in order to successfully execute on the business strategy.

3 Challenges for Supervisory Boards, Management Boards, and IT Management

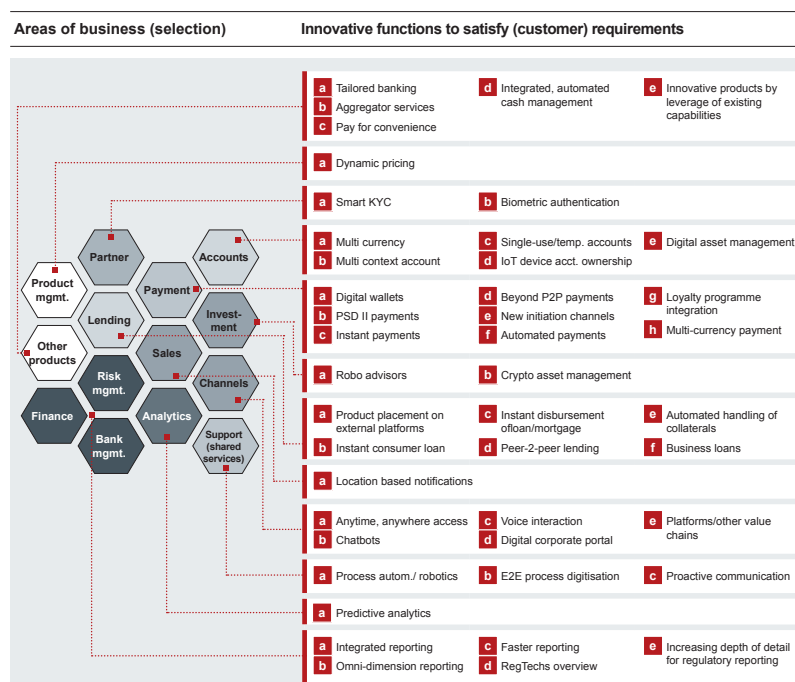
3.1 Locally optimized solutions in existing architectures are associated with an explosion in cost, complexity, and time—combined with a loss of functionality

An analysis of developments in the financial sector clearly illustrates the technologically induced changes in customer expectations/behavior, in the structure and positioning of the competitors of traditional financial institutions, and continuous evolution in the regulatory field. increasingly, IT plays a disproportionately significant role in the financial sector—with its almost fully digital products—meaning that virtually all new requirements arising from such changes have to be implemented within IT systems.

This situation is, per se, not new for the financial sector; the traditional and, in many cases, current strategy in this regard is to develop annual project portfolios that exhibit classic prioritization and that comprise lifecycle measures, measures that implement regulations, and—insofar as they can be realized due to budgetary constraints—business development projects.

Managing singular developments no longer does justice to the levels of complexity

This approach to portfolio management—based on a technological basis that, at its core, originates from the 1970s/1980s—has given rise to the huge diversity and “technological sedimentation” discussed at the beginning of this paper. This is now supplemented by a raft of requirements resulting from changes in the customer, competitor, and regulatory landscape. Analyses from the perspective of customer expectations/customer behavior alone indicate that almost all divisions of a bank are addressed in one way or another by new technological possibilities.



Source: COREresearch 2019

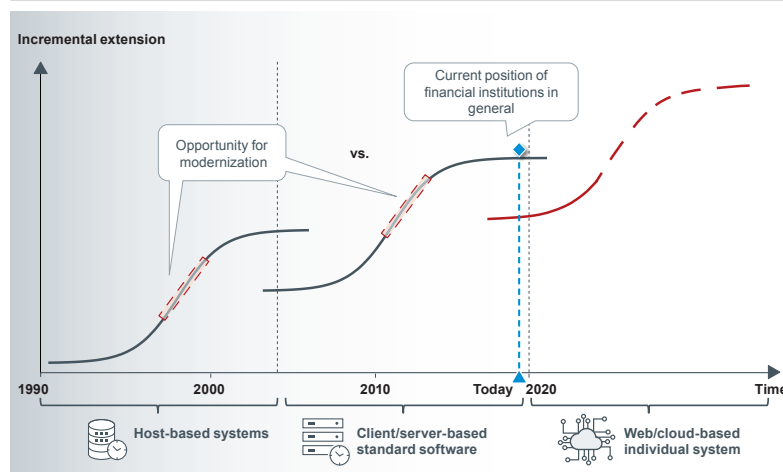
Fig. 7 – Overview of innovations within various business units of a bank

If the issues/requirements relevant to individual business units are taken into consideration as are the singular business case analyses usually anchored within portfolio management processes, individual requirements are recognized that can always be implemented on a case-by-case basis within the existing IT architecture. However, the corresponding projects are always significantly more expensive due to technological debt and take longer to implement than for competitors which rely on more recent architectures.

Recent examples include PSD2 implementation projects in established financial institutions (the German *Sparkassen* and the *Genossenschaftsbanken* as well as universal banks in the private customer segment) vs. similar projects at aggressive market players (N26). If we additionally consider that requirements do not occur one after the other, but rather at the same time, the high investments of cost and time accumulate. Moreover, the inherent complexity of the system as a whole—which was not developed and designed to meet today's requirements—increases every time an individual requirement is implemented within the existing architecture. Moreover, implementation periods are becoming increasingly longer as the status quo only enables limited parallel implementation from a technical and organizational standpoint.

New organizational and technological concepts accelerate the number of functions and resulting specialization

Correlation between functional extension and the technology basis used in terms of time



Source: COREresearch 2019

Fig. 8 – Efficiency leaps in technological deployment

These effects are caused by legacy technology found in the core of IT platforms of many financial institutions. There is an urgent need for structural renewal of the technological basis and the related paradigms for handling requirements, for ongoing implementation/deployment and for IT operating models and their underlying infrastructure to maintain competitiveness.

3.2 Enterprise architectures—the paradigms of the past hamper realignment and the modernization of business models

Mature enterprise architectures within the financial sector are dogged by a variety of historical developments, especially their origins as trailblazers of information technology. The technology introduced back then was so futuristic that in-house departments were established in which technicians in white coats were charged with guarding the holy grail of data processing. Despite the ubiquity of IT, this organizational separation has still not been lifted in many places, even if the apparel has since changed. The available expertise was, until the end of the 1990s, so rare that highly paid specialists were needed to develop generic financial software.

These programs had an exorbitant price tag and, in many cases, were merely integrated within individual institutions. The ensuing architectures are characterized by integration logic that is as narrow as possible and that ensures the process flow across the various production, controlling, reporting, risk, and channel systems.

This often results in a variety of added systems within architectures; their connectivity—i.e. the number of connections and interfaces between them—is extremely high. Rather than integrating individual modules via suitable integration tools and anticorruption layers resulting in decoupling interface, the modules are often connected directly in an 1:1 fashion with each system they interact with.

The resulting combinations tend toward m:n connections, meaning that it becomes de facto impossible to replace individual systems. This development has been accelerated by supplementary implementation projects resulting from escalating regulatory requirements since 2009, with most of these projects completed using this non-harmonized architectural basis.

Functional and technological sedimentation of back-end systems must be managed

1:m vs. m:n

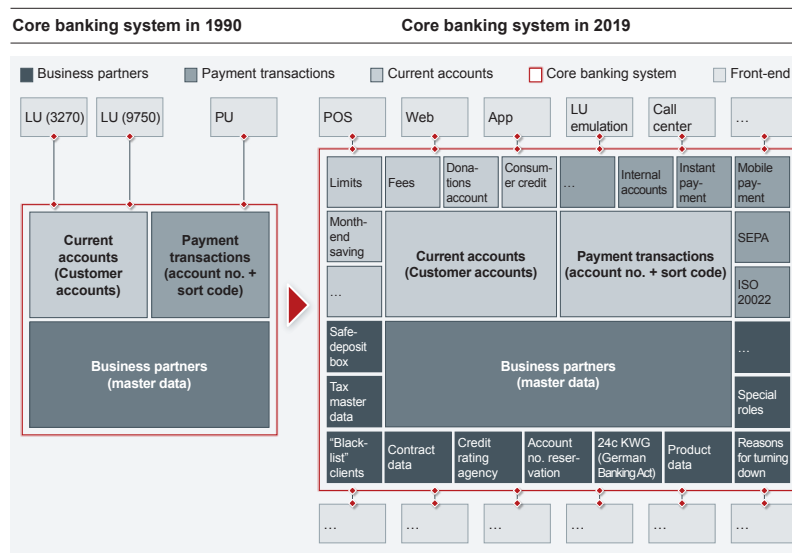


Fig. 9 – Functional enrichment within core banking systems in the past three decades

In hindsight, system designs were insufficient. Over time, further requirements successively occurred that were not factored into the original design. To remedy this issue, the subsequently devised requirements are met with supplementary solutions. Considering the many interdependencies among individual systems, this process of augmenting existing system landscapes is one of the main drivers of complexity. The complicated nature of these mature IT architectures has now reached levels that make it almost impossible to act in a fast, cost-effective, and innovative way.

Current concepts of IT architecture management are reaching their limits

The problem is compounded by mushrooming relational enterprise data models whose singular complexity is so high that there is no way of avoiding key person risks and all the ensuing consequences. Some financial institutions have capitulated in the face of this development and do not even maintain such experts in-house. As such, they are dependent on their service providers and freelancers, meaning the inevitable retirement of such personnel is akin to a strategic risk that threatens the business. Also, changes to such models and the systems based upon them can only be performed to a limited extent in parallel, which ultimately means that the success or failure of transformation projects hinges on just one or two resources.

Over the years, the technical debt contained within existing financial systems has become such a burden that a transformation of legacy architectures can be classified as risky from both a commercial and technical viewpoint. However, it will become imperative for numerous institutions to undertake these from a business strategy perspective if they wish to retain access to their customer base.

Every hesitation makes it possible for disrupters to position lean, highly automated functionally products and services thus continuously diminishing value chains and market shares. Intermediaries are given the opportunity to further exploit customer touchpoints with complementary products and services. Both cautious scenarios reduce business potential and company value, which—among other factors—is reflected in the financial institutions' share prices.

3.3 Organizational resistance—the stubbornness of technological organizations slows down technology lifecycle management

The constant factor driving technology enthusiastic engineers is the fact that system designs become outdated almost as soon as they are finalized, as the high cadence of exponential technological developments leads to a constant stream of better alternatives for individual components within architectures of heightened complexity. Therefore, even state-of-the-art architectures can and must be continuously enhanced, as a lack of innovation management is bound to lead to stagnation.

Organizational impedance.
Technology not the only challenge

Thanks to the myriad interdependencies of mature and complex historic systems, organizations only making incremental changes find themselves trailing behind. As technology lifecycle management—where implemented by institutions—still takes place over five phases, this effect is accentuated under the influence of exponentially developing technical ecosystems from which large parts of the finance sector are widely excluded.

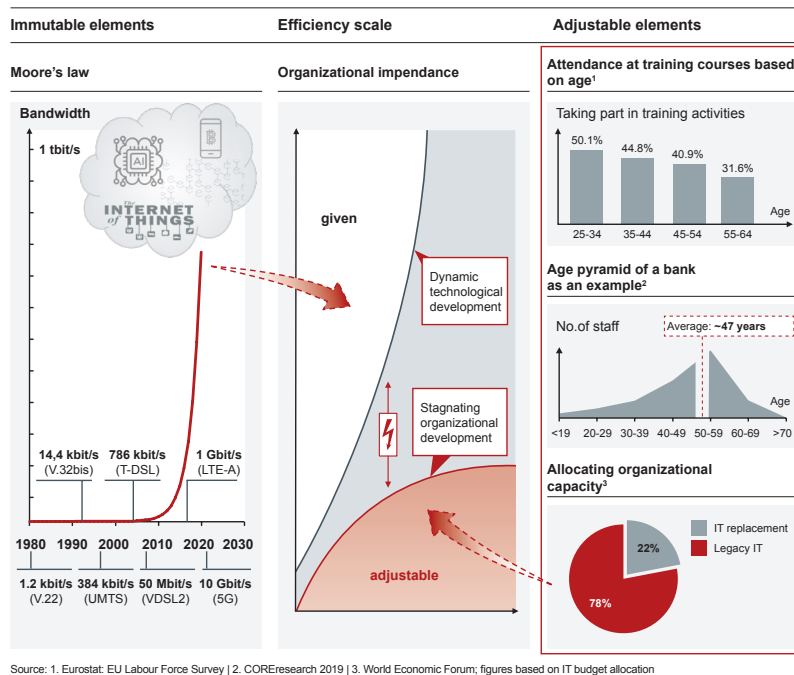


Fig. 10 – Factors influencing organizational resistance

The organizational structure constitutes a key challenge in designing the necessary structural changes offered by new technological possibilities. The main problem is that an organization—and the people at the organization, who interact with each other within the scope of different processes—only adapt to the necessary changes at a relatively slow pace, whereas the technology itself evolves exponentially. And when it comes to the need to replace the technological basis, there is often a problem of a lack of skills in respect of new technologies, procedural/collaborative models, flexible governance, etc.

This lack of skills then gives rise to fear of loss of importance and concerns about job security; as such, organizational stubbornness often hinders the process of modernization. In many cases, the governance structure that has emerged within an organization is the result of myriad historical factors, such as the allocation of responsibility within the product portfolio, geographical considerations, mergers and acquisitions, political decisions and many other aspects.

As the financial sector was a particularly early adopter of information technology, it often features established structures that stipulate a strict separation between functional and IT departments/personnel. By contrast, tech companies and FinTechs—which are or will become new competitors for traditional financial institutions—do not show this structural phenomenon. Therefore, they have a fundamental advantage, which is reflected in more rapid adoption of new technologies and the resulting potential for positive business development.

Organizational challenges greater than technological ones

3.4 Single-focus core banking replacement programs have regularly failed in the past

Large-scale, multi-year projects focused solely on IT modernization through the replacement of a core banking system are structurally unsuitable in terms of flexibly adapting to dynamic, ever-changing, underlying conditions. They take longer than planned, go over budget, and do not deliver the envisioned benefit. Alongside the technical difficulties associated with high connectivity, interdependence and the resulting excessive complexity, the huge deviations from the objectives of such programs are rooted in three main causes: i) too much initial optimism, ii) strategic misinterpretation on the part of decision-makers, and iii) ever-changing requirements during the course of the program.

Greater focus on the management of mutual dependencies

- The optimism caused by people's positively biased cognitive when assessing future events. Minor probabilities are, compared to major ones, significantly and systematically overestimated. An insight for which the Nobel Prize for Economics was awarded in 2002.
- The distortion in presentation is based on the political behavior of those involved. Improving the depiction of the future project outcome by overestimating the project return rather than its cost makes it more likely that the project will be implemented. This behavior can be attributed to political and organizational pressure, e.g. the battle for scarce resources such as budget, personnel, and experts.
- On account of the complexity of the systems, the vast array of banking products covered by them, the number of interfaces, and therefore the interdependencies with surrounding systems, the replacement of a historically mature core banking system is a task that takes several years. Given the previously outlined developments in technology and on the market, significant changes in requirements are bound to occur during the term of the program. Studies from the University of Göttingen back in 2013 established that the pace of change in requirements is by far the most important factor in the fundamental failure of major IT projects, alongside high coordination requirements and insufficient transformation expertise.

Various projects, although completed, ran over time and over budget (e.g. Credit Suisse, UniCredit/HVB, Raiffeisen Switzerland, Quirin Privatbank, HSH Nordbank). In many cases, programs were aborted prematurely (e.g. Deutsche Bank—SAP, LBBW—Temenos, BHF Bank—Avaloq, TeamBank—SAP).

A mono-clausal "infrastructure" project focused solely on replacing a core banking system is hence unsuited as a procedural model for the necessary structural overhaul of financial institutions' technological bases.

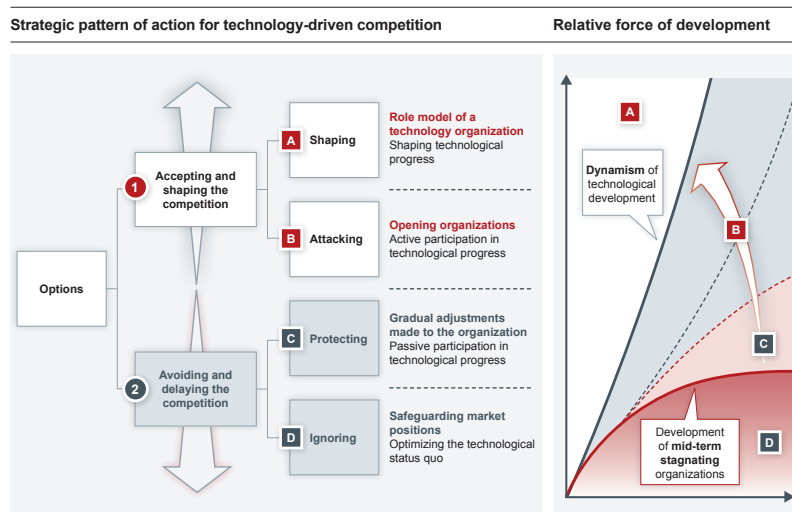
4 Proposals for Resolving the Dilemma Facing Supervisory Boards, Management Boards, and IT Management

We regard it as a *conditio sine qua non* to answer the fundamental question of whether to accept the competition and expose the institution to it more strongly or whether to avoid the competition and delay confrontation with it. The institutional challenge of charting unfamiliar territory and questioning the priority of pending challenges in conjunction with dynamic market developments is challenging. We advocate however to address the situation strategically, i.e. to assess the factors holistically based on sound technical expertise.

With this in mind, we see four types of basic reaction, two of which are relevant to senior management in terms of the current debate:

- “Shape”: change an existing market or build a new one
- “Attack”: go on the offensive in an established market
- “Defend”: seek to hold your own in an established market
- “Ignore”: turn a blind eye to the forces influencing a market

Each of these options has arguments in its favor and should be subjected to a careful and nuanced assessment for each market segment and product group. Furthermore, consideration must be given that long-established structures give rise to highly mature organizational forms, whereas new segments usually operate with less organizational maturity. Therefore, a distinction must be drawn between technological possibilities and organizational structure for each option.

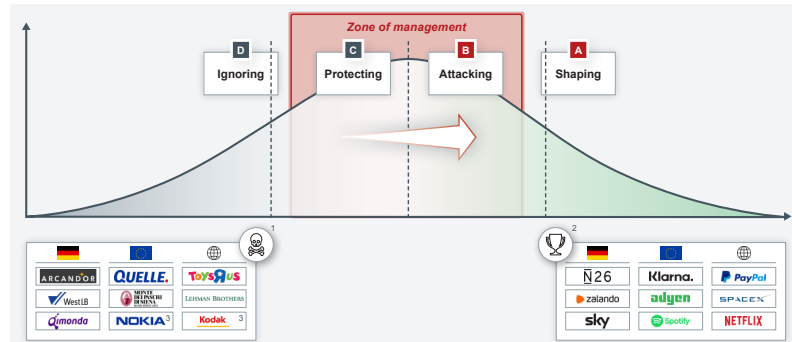


Source: COREsearch 2019

Fig. 11 – Strategic options

Governing bodies and management should decide on the basic future stance of the institution and segment. This is illustrated with examples in the graphic below.

Long-term focus in the management of organizations and technologies



Source: Company business reports | 1. Company closures in Germany, EU and worldwide in the past 15 years | 2. Rise in profit in Germany, EU and worldwide 2012-2019, expressed as CAGR | 3. Established companies that were too late in adopting digitalization processes

Fig. 12 – Classification for management focus

Once that decision has been taken, we suggest using a framework that helps operational management calibrate the tactics including all nuances discussed above. In summary, the four basic reaction types should be discussed in five dimensions:

- › Technologies and innovations
- › Organization and culture
- › Decision-making and risk culture
- › Structures and processes
- › Value creation and partnerships

Organizational level of expectation for management as well as a lever for adjustment

Lever	I	II	III	IV	V
Expectation	Potential of technology & innovation	Organization & culture	Decision-making & risk culture	Structures & processes	Added value & partnerships
A Shaping	Active driver of new technologies without any legacy restrictions	Setting up new, independent organizations based on existing structures	Try-fail-learn in shortest possible cycles	State-of-the-art redevelopment	Leaving behind existing ecosystems & setting up new structures
B Attacking	Gradual transformation of existing legacy with current technologies	Reorganization, focussing on modern organization models & technology	Opportunity-based decisions; focus on innovation	Shaping and adapting new methods and tools	Embarking on added value with a focus on innovation
C Protecting	Modernization geared towards tech life cycle	Selective impetus on innovation (lab); long-term restructuring	Risk-balanced decisions; focus on security & costs	Ongoing optimization of the status quo	Partial embarkment with a focus on leveraging efficiency
D Ignoring	Long-term utilization of technology basis	Cultivating and safeguarding legacy skills	Strict mitigation of risks	Opportunistic optimization of the status quo	Use of existing ecosystems and retaining the value chain

Source: COREresearch 2019

Fig. 13 – Framework for introducing measures

Additional recommendations have been split into three categories:

- › Strategic planning
- › Organizational alignment
- › Technological perspectives

We suggest this categorization be adopted in the financial institutions' overarching strategy work, as hierarchical conformity and project progress determine the success of related programs going forward. A further prerequisite in terms of following the recommendations is that rudimentary knowledge of current technology management is either adopted or measures are taken within organizations to facilitate these capabilities at an institutional level. With this in mind, we wish to recommend the following courses of action.

4.1 Recommendations for strategic planning

In recent years, strategic planning at financial institutions has been dominated by saving costs, regulatory adjustments, and tweaks to business models. After ten years of continuing technological developments and new (and generally less pleasing) expectations concerning the medium-term trend in yield curves, drastic action is now urgently required in order to safeguard business models. This goes hand in hand with a more result-driven and more emancipated approach to tackling technological questions within the scope of strategic planning. The following recommendations are advised for this modified form of strategic planning.

Focus on value-adding processes
and their E2E implementation

4.1.1 Greater differentiation to be made between the strategic definitions of future business models

Exponential technological evolution is lowering barriers around the world and causing markets to merge. This implies much more nuanced competition and opens the possibility of achieving significant earnings—on a global level—with products and services that are considerably more focused than they previously were. The achievable benefits in terms of economies of scale have reached unprecedented levels and, in some cases, are deliberately used to exclude competitors in established yet locally limited markets.

The underlying cost benefits are no longer leveraged through the depth of value creation however, but largely by means of scaling; a prerequisite in this regard is a high degree of specialization. Being a combination of end customer platform and infrastructure provider is no longer an advantage, but is instead prohibitive for long-term success, which is clearly demonstrated in the payment services provider segment.

The comparative advantage of disrupter organizations is frequently attributable to a one-product strategy, i.e. a strong focus on a single product, functionality or service—with unique selling propositions (USPs) in the internal and external dimension.

For established organizations, the attainment of competitiveness is possible whenever available assets such as customer base, market power and brand, etc. are efficiently deployed and whenever the benefits of the disrupters are mitigated or, if the underlying mechanisms are actively harnessed.

This does not mean that universal banks and other corporate structures—which usually comprise conglomerates of business models—must be reduced to one-product companies. It does, however, mean that each product/service must own its entire production base and be fully responsible for its own successes and failures. Dependencies and interrelations between products/services must be systematically broken up and the products and strategies decoupled. Interchangeability and competition are key. This task must be performed separately, and in isolation, for each unit, i.e. without (initially) seeking to harness company-wide synergy effects.

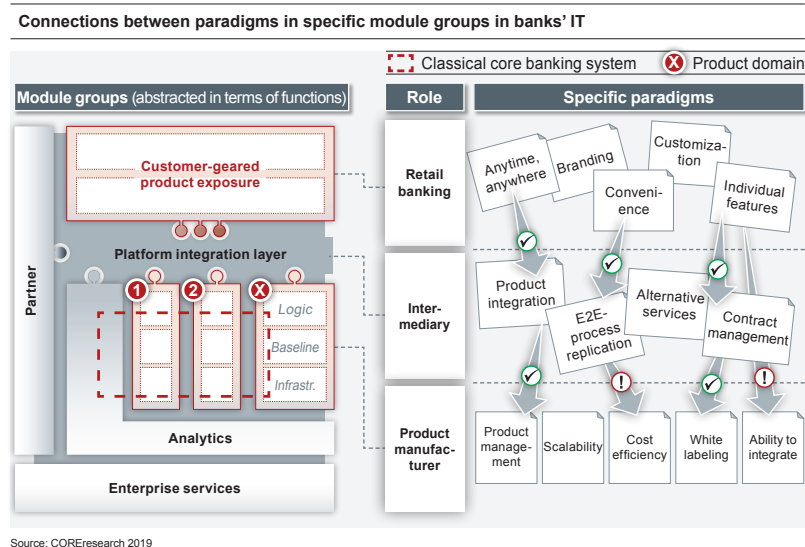


Fig. 14 – Overview of conclusions from the categorization of product domains and business paradigms

If the business model has been precisely defined, it is important to establish necessary underlying conditions and eliminate distractions. The required skills of the operative individuals play a key role in this regard. There is often a lack of technical expertise combined with a proliferation of non-value-generating activities. In times of prosperity, universal structures are a safeguard against volatility; in times of political or economic adjustment, clear boundaries and local optimization are essential for survival in battles for resources.

It is therefore logical and imperative to identify, safeguard and systematically build on core competencies. Any structures that do not serve the core business must be eliminated. This also holds true within IT systems. Otherwise, the efficiency gains are canceled out by rising IT costs. An even more serious potential consequence could be delayed or less functional solutions.

4.1.2 The increasing significance of ecosystems must be accepted—and companies' own products and services embedded

The possibilities afforded from the omni-availability of information are increasingly being tapped into and continuously established in all areas of the economy and society. Platform providers are significantly and sustainably altering customer interaction and/or offering functions that allow customers to make decisions more freely. Consequently, existing customer interactions are being redefined.

The societal context is shaped by complex, far-reaching, and sometimes multidimensional interrelations. Consequently, the battle no longer rages on a defined front between clear opponents with similar business models. Instead, it is multilayered, agile, and results in significant competition between disparate business models. It is therefore highly likely that this competition can no longer be won or lost alone but will instead be decided by ecosystems.

A further consequence is that members of these ecosystems are disproportionately successful when they proactively harness this cooperative culture and generate supra-corporate advantages.

This requires a paradigm shift in the management culture, as there is often a difference between practiced and learned cultures. Technical standards, connectivity, and governance capability are necessary but downstream factors. This context and the necessity for cultural counteraction in favor of a network economy with new technological possibilities will gain more significance—if it hasn't already done so—for classic, network-oriented structures. The pressure to adapt is continuing to rise, and greater use of the technological possibilities of the cultural transformation—from more personal networks to technologically supported network structures—should be higher on the agendas of governing bodies.

The design of ecosystems will be simplified considerably by new technical interaction formats. In the financial sector, this process is also stimulated by regulatory requirements, meaning that it would be irresponsible to ignore this development. Indeed, the governing bodies of financial institutions need to stimulate the process of ensuring that underlying conditions distribute burdens and results fairly, that these underlying conditions are subject to regular review, and that technical prerequisites are safeguarded.

Partnerships and their structure are an increasingly critical success factor

Transforming the network culture from personal to technologically assisted formats is the governing body's task

4.1.3 Established controlling and management functions are to be adjusted; separation of IT and business needs to be overcome

Mature and established project management mechanisms and decision-making methods for change-the-bank (CTB) processes and run-the-bank (RTB) mechanisms in day-to-day operations do not take the underlying conditions into account. The existing systems and functions are no longer marketable, demonstrate a correspondingly low level of efficiency, and are impairing commercial success. It is the task of relevant governing bodies to identify and, where applicable, to actively recognize this—without waiting for the regulator.

In terms of the management of day-to-day operations by platform-assisted systems, it will be essential in the future that only the KPIs derived

from the defined business model are measured and that decisions at every organizational level are based on quantitative methods. Fact-based decision-making models will become more important than the personal experiences of individuals involved. Moreover, a greater degree of independence can be stimulated, and the necessary degree of marketability achieved, in connection with the accompanying E2E accountability. It is highly likely that the derived mechanisms and indicators will behave in different ways for each business model; in large corporations, they may even behave antagonistically to established structures.

These contradictions should, with the assistance of reporting experts, be promptly addressed and anchored in group management structures.

It is nevertheless important that both business and IT requirements are dealt with using the same systematic approach, and identified and reported in a harmonized, emancipated manner in the future. Degrees of automation should be gradually increased—and self-managing control loops introduced.

4.2 Organizational recommendations

A strategically nuanced structure/alignment and the handling of new technological paradigms require the adjustment of organizational structures if positive changes are to be realized at institutions with a lower predisposition to risk. Without organizational adjustments, technology-driven measures run the risk of being counterproductive. Furthermore, innovative organizational forms such as Chief Digital Officer (CDO) and the structures involved will not be able to leverage the potential hoped for at the time of their creation.

4.2.1 Domain-driven design to harmonize the organizational and overall architectural structures

Experience shows that functional and non-functional requirements are often subject to considerable fluctuation, especially considering the technology-driven dynamization. When this meets a complex, interdependent IT architecture and functional and IT organizational structures trapped in the status quo, this gives rise to stagnation and a sense of resolvability.

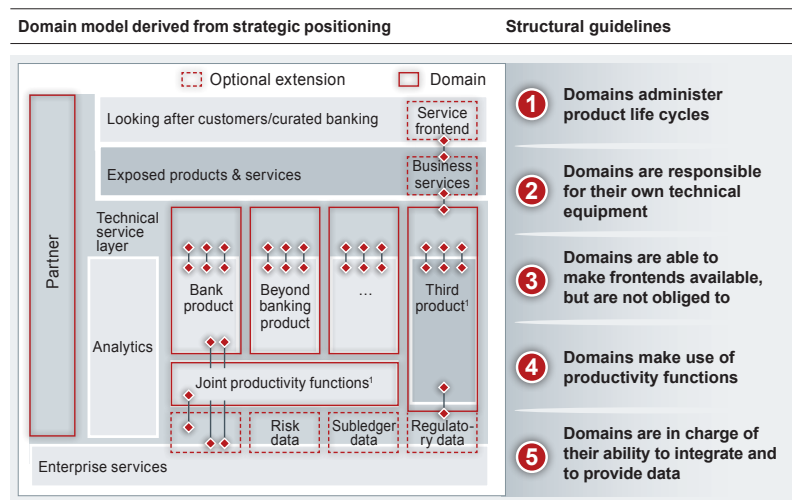
Domain management must be introduced and enforced

As regards the technical dimension of software development, this has led to the development of the “domain-driven design” concept. The concept identifies functionally related (cohesive) domains and structurally separates them from another. The extent of a single domain is limited with respect to multiple dimensions, including functional scope, IT complexity, parallel change requirements, employees involved, and organizational units. This approach requires clearly defined domain boundaries and standardized interfaces (available to third parties) for integration within overall architectures. The functional and IT knowledge required to understand a domain is limited and isolates domains, with multiple positive effects:

- Differentiation in terms of solution design (e.g. customization/convenience in customer-focused domains vs. standardization/scalability in product-focused domains, regulated vs. unregulated products, etc.)

- › Increased interchangeability and extendibility thanks to modularization
- › Reduction in induction period for (ongoing) development and maintenance
- › Prevention of the network effects of continued complexity
- › Enabling of local optimization and technology lifecycle management

The process of defining and isolating domains makes it possible to set priorities, meaning that focus can be placed on market-differentiating functionality, with dependency analysis and classification in core/generic domains.



Source: COREresearch 2019 | 1: e.g. archiving, correspondence, identity & access management etc.

Fig. 15 – Domain model for a bank (example)

Domain isolation requires interfaces to contain domain logic while simultaneously making the necessary functionality available to third parties. Coordination is required with all dependent domains in order to define what is required of the interface. Once the interface has been defined in a way that describes the interaction of dependent domains, these domains are then decoupled and therefore free to develop without requiring any additional alignment. The interface definition acts as a contract between the domains and guarantees functional and non-functional reliability.

The establishment of enclosed and internally functional domains with correctly defined integration interfaces lays the technical and organizational groundwork for incorporating third parties build ecosystems. Complete domains can be substituted by external services found in the market without running the risk of having to question or remodel the overall structural architecture.

Enclosed domains
and precise interfaces
are essential for
ecosystem design

The partners involved can adopt various roles, depending on their own strategic positioning, e.g. distribution channel/customer touchpoint for their own products, external product providers to expand the portfolio of a retail bank. The establishment of institutional capabilities (both technical and organizational) in terms of developing digital interfaces should be an inherent component of the design of a domain model with a viable future. The focus should be on the following aspects of organizational development:

- › The mentality of creating almost all value in-house, which is often found in traditional financial institutions, should be altered to reflect the ecosystem ethos. Other market players are not automatically competitors but may also constitute value levers for organizations based on a spirit of partnership. Cultural openness to cooperate is required. Open-source developments illustrate the significant positive effects arising from such partnership models.
- › Digital ecosystems need functioning integration mechanisms on a technical level. A variety of semantic and technical standards are being developed for this. Therefore, the development of skills that facilitate systematic use of these marketable, often open-source standards (REST APIs, OAuth 2.0, OpenID Connect, etc.) for the purpose of technical integration should be built into training programs for employees and the management personnel involved.
- › Alongside cultural openness and the technical skills required for cooperation, it is important to create the underlying conditions for flexible and effective partnership models within compliance and control functions, especially in a regulated financial sector. The establishment of a tool-driven, at least partially automated onboarding/offboarding process for partners—including outsourcing management that is compliant with regulations—is recommended, as is a revision of the policy framework.

4.2.2 Systematic deployment of agile processes and tools is recommended for product design and implementation, not as an ubiquitous collaboration model

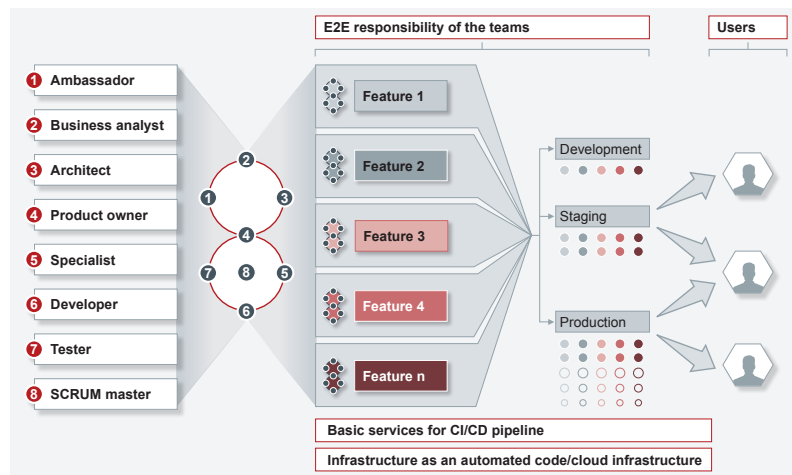
Interdisciplinary working methods are now almost ubiquitous. The majority of financial institutions still often separate market screening, requirements analysis, implementation responsibility, and monitoring functions. The separation of business departments and IT perpetuates suboptimal process design by not enforcing E2E accountability. Local optimization within the product development lifecycle results in cumulative trade-off. They often result in additional costs that are not tolerated by the market, neither in a functional nor a budgetary sense.

The DevOps approach is designed to prevent local optimization that hampers operations by merging business, development and operations. Given the experience that operating costs account for a significant portion of the total cost of ownership, there is little excuse not to employ it.

More effort should be made to ensure that interdisciplinary E2E functions gradually enter the product and process landscape. This means more autonomous teams that implement targeted, time-limited, skills-focused project organizational structures using modern organizational methods (agile, Scrum, *kanban*, etc.).

Implementing systematic E2E responsibilities in an emancipated structure spanning function and technology

Autonomous development programming



Source: COREresearch 2019

Fig. 16 – Organizational model for business and technology transformation

4.2.3 The extensive automation of previously cross-divisional functions in software development/system provision is desirable

The ever more frequent provision of new and complementary functions is supported by extensive automation of repetitive integration, testing, and deployment processes—or is only made possible through the adoption of these processes in the first place. The systems must be designed such that even multiple deliveries of new functionality throughout the day pose no problem. These kinds of release strategies require an extensive testing regime; not only are functional and non-functional unit, integration, E2E, security, and client tests—as well as release strategies such as canary deployments and blue/green deployments—imperative, but fuzzing and mutation testing should also be included in the automated release pipelines, especially in security-critical areas such as the financial sector. From an organizational perspective, it is worth noting here that previously developed project or program organizational structures are to be dismantled in the allocation of functional, development, testing, and integration units.

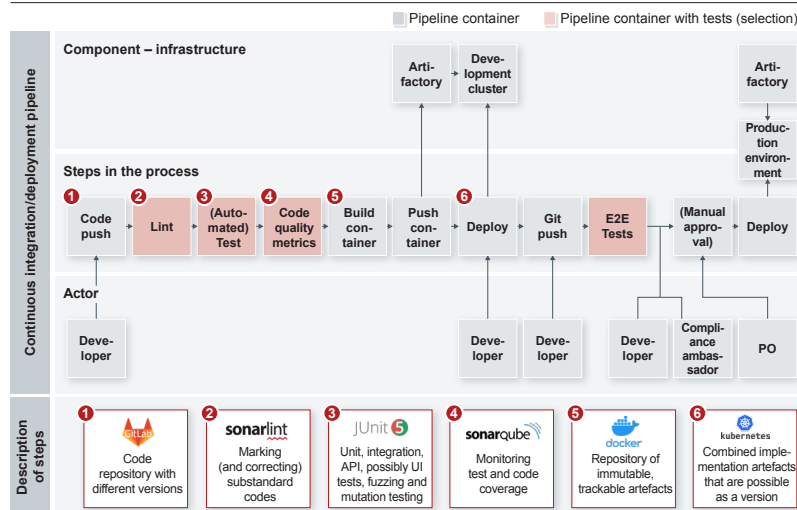
Modern Biz/DevOps concepts require close dovetailing of these competencies, as well as extensive process/technological support. Once these underlying conditions have been successfully established, it is possible to leverage high organizational efficiency gains. Recent empirical research suggests that organizations leveraging such methodology indeed become more efficient with size, as opposed to being stifled by rising overhead for growing organizational size and hierarchy.

The maximum effect can also be generated whenever overarching structures, such as central institutions, and affiliated units or subsidiaries start to act within the same structure—and when these cross-divisional functions can be orchestrated in a uniform manner across all legal units, sharing the costs. Until now, different approaches and various experiences have been witnessed in the various regions and market structures covered by the German Banking Industry Committee, the Swiss Bankers Association and in Austria. Considering the financial institutions' current earnings projec-

Biz/DevOps concepts should be established in the face of resistance

tions in the forecast, we assume harmonization will soon take effect with respect to processes having been assiduously kept separate in the past.

Examples of deployment pipeline for container and cluster environments



Source: COREresearch 2019

Fig. 17 – An example of a CI/CD pipeline with suggestions of supportive software tools

Besides technical and functional monitoring processes, it will also be necessary to automate all approvals and compliance processes in relation to fully automated release strategies. Although this is highly complex and difficult, it can—if successful deliver a huge competitive edge on account of the innovation speed and significant cost reductions achieved. This again shows only organizations open to interdisciplinary cooperation will be able to thrive in the more dynamic market of the future.

4.2.4 More active management of the dependencies of complex technological transformation processes will be a critical success factor

Transformation projects of core banking systems have regularly failed due to the challenge of reconfiguring historically mature systems of huge complexity within day-to-day operations and while simultaneously introducing new systems. We are only aware of a handful of positive exceptions. Comprehensive strategic transformation analyses generally suffer from heightened complexity due to unnecessary technical and functional dependencies.

Isolated analyses of the two key subordinate issues and subsequent optimization make it possible to master the inherent complexity. One way of simplifying the analysis is to separate the discussion surrounding the target operating model and the technical system design from the discussion concerning the decommissioning of the legacy system; there are three ways of handling the de facto mutual dependencies:

- › Functionally dependent event triggers
- › Staggered and parallelized planning
- › Deliberately separational and concurrent organization

Proactive complexity management is to be introduced as a management discipline and developed autonomously

The trivial option of independent analysis leads to systematic implementation, but also harbors significant destructive potential, as the legacy system will be decommissioned opportunistically, without regard to the losses and irrespective of whether a new solution is in place. This option only makes sense in exceptional cases, such as reinvestments or business process re-engineering cases. In terms of due consideration, the option of staggered planning is similar to independent analysis, as the system is decommissioned in line with a strict plan. This option is beneficial in the case of successive migrations and where new solutions are already in place and may, for example, make sense where there are quantifiable residual risks in respect of defaulters in order to prevent the excess influence of long-tail problems. The impact of such long-tail reductions on P&L can be mitigated by means of suitable migration prioritization (e.g. sorting the customer base being migrated by profitability). A functionally dependent analysis requires an analysis of the functional dependencies themselves and is the basis for all migration planning.

In terms of the time frame, systematic planning will generally be functionally dependent at the start in order to transition to a staggered logic following provision of the new systems, maintain the migration pressure, and prevent negative network effects caused by delays. Network effects can compound even minor delays to supposedly unimportant subprojects. In turn, this has a huge effect on the transformation and can result in correspondingly high costs. Due to the numerous dependencies, the process of tackling these effects is costly and time-consuming.

A corresponding analysis often has no positive effect due to the ever-changing requirements and, consequently, the avoidance of delays in early project phases should be prioritized. Instead, senior management often becomes more uncertain in the maze of emerging external structures (e.g. processing routines and risk assessments) without addressing the nucleus of the problem or potential solution. We suggest sharpening the focus from a management perspective and using expertise as a management lever more than was previously the case.

4.2.5 Short-term objectives that can be implemented must be formulated and detailed functions (as MVPs) are to be delivered

Due to the complexity of a transformation, it only makes sense in exceptional circumstances to produce an overarching business case. Besides basic viability, the volatility of the requirements is so high that any business case will become outdated as soon as it is completed; additionally, the opportunity costs are difficult to quantify. As such, it is irrelevant and provides hardly any useful insights. Instead, the fundamental strategic structuring should provide objectives that can be implemented quickly and that contribute to viable target operating models; these increments should be supplied as minimum viable products (MVPs).

It is important that the MVP should not constitute a trial balloon; it must exhibit product quality and be marketable. Further, it is important to ensure that the desired MVP functionality can be used productively and generates concrete business benefits. Incremental business cases are achieved that make overarching, far-reaching planning obsolete.

Organize fragmented work packages in fast and functionally aligned management

Each system iteration needs to deliver business benefits and should pursue the aim of reducing complexity of the legacy system to such an extent by means of carve-out tactics that only low yield cases are left at the end of the transformation, with their criticality for the target operating model low or at least quantified. This allows calculating business cases for continuing to run legacy systems

4.3 Recommendations for technology management

Leveraging the full extent of modern technological possibilities is necessary but not by itself enough to design efficient business models for the finance industry. Additional measures need to be taken whilst designing and implementing strategy to duly incorporate constraints imposed by technology interdependencies. We counsel considering the following five suggestions.

4.3.1 Standardization of interface architectures in and for the finance sector, in order to protect design sovereignty in the business models

There are cross-industry standards in both retail banking (e.g. HBCI, FinTS, PSD2) as well as in the commercial and wholesale banking sectors (EBICS, SWIFT, FIX etc.). Nevertheless, the development of uniform APIs is still in its infancy when compared with other industries because those APIs are primarily limited to external communication. In the automotive industry, for example, cross-manufacturer industry standards ensure that standard components such as brakes, bearings, sensors, etc. can be used and substituted without any need for adjustments.

Orchestrate a debate by associations on the industry-wide standardization of interfaces

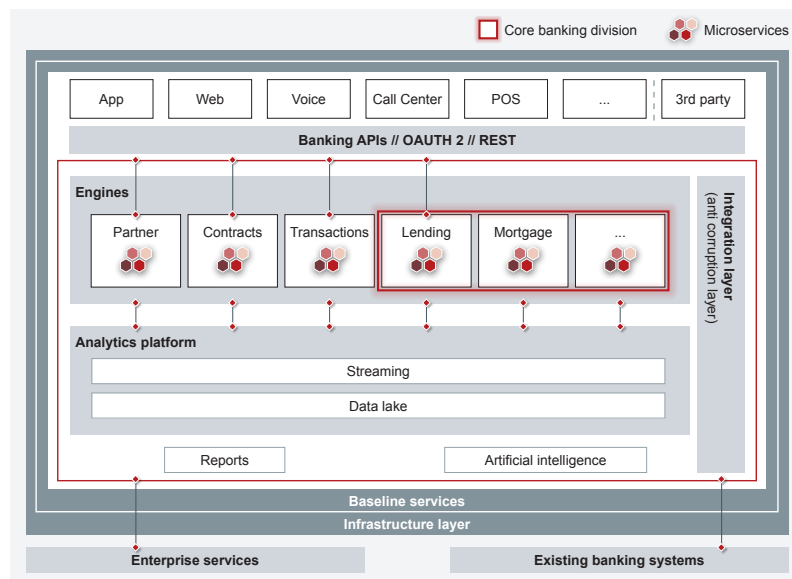
In many parts of the finance industry, there is a lack of comparable standards requiring similarly simple product or reporting systems for interoperability, which could be a rewarding field for tasks in the respective national banking industry associations (BdB, DSGV, BVR, VÖB, BBA, SBA). International organizations such as BIAN (bian.org) have already made a name for themselves, but the corresponding standard is still not widely known, due in part to the fact that it opposes strategic interests, especially of major standard software manufacturers, as this kind of standardization would greatly reduce the lock-in effects (e.g. API vs. BAPI in the SAP environment).

Decoupling different domains, by establishing defined interfaces must ensure that the functionality of a domain can be made available in the overall context without it being necessary to know about specifically used domain logic. At a local level, this leads to more work in the design of decoupling interfaces and anti-corruption layers. From a global perspective, virtually all non-functional requirements are optimized, thereby resulting in reduced total cost of ownership and a higher degree of flexibility and speed of change and less need for maintenance.

Domain-driven design assumes that systems are not designed generically, but rather that they are abstract from business logic, including process logic, and are shown in a completed, consistent, isolated and permanent state. In concrete terms, this means that all functions and transactions must be able to work and exist without the need to depend on other systems.

This is in direct opposition to integration architectures frequently found, in which standard software is orchestrated by process machines (e.g. based on Business Process Model and Notation), whose main cardinality leads to great complexity, which makes it more difficult to replace individual components and often ultimately makes it impossible without some preparatory projects.

Modernized IT architecture in banks



Source: COREresearch 2019

Fig. 18 – Architecture for a future constellation (diagram)

The requirements for data availability, simulation capability, evaluation capability and real-time processing, which have increased over the years, mean that systems based on batch processing can no longer meet the requirements and, since implementation of the requirements is indispensable, must either be replaced or augmented. As a replacement is virtually the same as a total transformation of the system landscape in many places and therefore cannot be implemented singularly for every requirement, an integration architecture without well-defined interfaces has evolved over time with a greatly increased overall complexity resulting from multiple links and network effects.

4.3.2 Structural renewal of the technology basis by means of parallel use of integration interfaces (APIs)

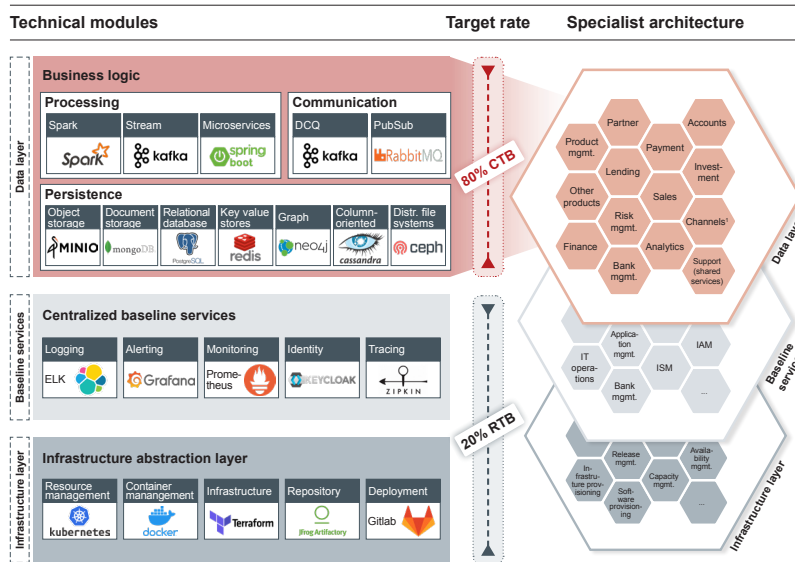
Modern tooling with its respective frameworks is often difficult and expensive to integrate into legacy architectures due to the lack of appropriate integration prerequisites and the need for fundamental infrastructure reconditioning. This technological debt is largely attributable to diminished infrastructure investments in recent years. Hence modern tooling—providing a high degree of automation and enabling complexity management—is often not used optimally in financial systems. Agile methods and modern architectural paradigms such as microservices are partly ineffectual in legacy architectures due to missing decoupling and system designs built around an enterprise data model which require a lengthy a priori design phase.

Data warehousing often intensifies the problem as a result of introducing additional data models, which again increases the overall complexity, since the high degree of integration results in all requirements having to be taken into consideration, including all dependencies.

Decoupling domains by way of interfaces, such as APIs, as well as (pub/sub) message queues and the usage of case-specific schema on read patterns are basic requirements for speeding up development in modern architectures. They additionally serve as integration patterns for external partners, including access management (IAM—Identity & Access Management) and allow the integration in third-party business models and processes.

APIs and pub/sub are the means of choice to ensure local systems and business processes can be integrated into corporate architecture and process landscapes. Consequently, concepts involving decoupling, interfaces and integration, including APIs, need to be designed for greenfield projects. Greater attention needs to be given to designing APIs as convenience and usability ultimately determine the speed of development, extensibility and ability to integrate. Wherever possible, industry standards need to be used or developed taking current technological standards into account. More time and money are generally needed for old-fashioned standards mentioned above, as they stand in the way of the use of modern software development frameworks. This, in turn, is an additional, mere cultural challenge in banks' IT departments, which must be appropriately addressed.

Design interface architectures with a third market in mind



Source: COREresearch 2019

Fig. 19 – Architecture for a future constellation (diagram)

Anti-corruption layers will initially be crucial for integrating old systems in transformation projects and investment will be indispensable in decoupling logic. Wherever possible, the interfaces should be designed in such a way that they are generally suitable for third-party ecosystems, i.e. there should no longer be any technical need to distinguish between internal and external use; the granting of access rights should merely be a business decision. Conversely, this also means providing internal services as a product to the market, thus enabling additive white label offers.

4.3.3 Reaction to dynamics—implementing technology lifecycle management geared towards shorter deadlines

The supplier market for banking software is fragmented, and the relevant software is rarely optimized for the use of modern technology, which is not least due to the long cyclical investment and depreciation periods. Technical constraints and underlying professional design paradigms are making the integration into modern IT architectures increasingly difficult with the growing scope of applications, which is partly intended by the providers in favor of lock-in effects.

Modern architectures mean a dramatic drop in service and maintenance costs

There will be even more distribution battles between core banking system providers and banks, which is why a preventive approach against “normalization efforts” is urgently recommended, in order to safeguard against their own profit pool from looting by tech providers. Evidence of such a pending conflict is demonstrated by the decisions taken concerning SAP product management for the strategic discontinuation of banking solutions and the company’s communication to the capital market, which took place virtually at the same time, of wanting to significantly multiply the share price—at whose expense?

It can generally be stated that the technical basis of commercially available off-the-shelf software (COTS) such as e.g. SAP, Temenos or Avaloq, is largely attributable to previous software generations. Modern architecture paradigms are universally ignored by these providers as new developments are difficult to finance. COTS providers in the financial sector have so far had difficulties in carrying out the change from licensing to software as a service (SaaS) models on a subscription basis that is common elsewhere in the software industry. This factor offers interesting market niches for banking as a service, business process outsourcing and technical service business models.

Modern IT architectures rely almost universally on a number of patterns, frameworks and technologies for integration and operation, the use of which is regarded as de facto market standard; examples are container frameworks such as Docker and Kubernetes as well as the entire ecosystem of service meshes based on them, routing and deployment solutions as well as API gateways, configuration and secret management, plus standard patterns such as centralized logging, monitoring and alerting.

This standardized and (fully) automated infrastructure not only makes modern architectural approaches possible, such as horizontal (auto) scaling, deployment strategies, but also distributed CAP cluster systems with zero downtime, which are widely available. Container and serverless concepts mean that it is possible to develop significantly more resource-efficient systems in combination with cloud-native infrastructure and application landscape than has been possible to date as a result of the available technology.

Customized system designs work in a similar fashion, whereby current system drafts, unlike previous generations, can be based on a broader and better selection of tools. In comparison to the past, it is common practice nowadays to use graph, in memory, column, document, key value database and other persistence systems alongside relational databases, in order to reduce the impedance between business model and technical implementation. The redundancy occurring in locally optimized systems is accepted

Customized approaches are becoming market standard

where necessary in favor of optimized system implementation and lower overall complexity. Low-cost storage systems available today, as well as automated system components and tailored system designs reduce the associated overheads.

The next technology generation such as Distributed Ledger Technology (DLT) is also offering interesting aspects which provides innovative answers to specific issues in the financial sector: For instance, DLT-based systems could make separate audit logs and similar monitoring systems superfluous and significantly reduce the necessity of reporting systems and interfaces for national competent authorities (NCAs, such as BaFin, Bundesbank, EBA, FMA, FINMA, FCA et al.).

Approved reporting mechanism (ARM) systems based on this technology could provide locational advantages for the financial sector because these systems and reports would no longer have to be maintained or produced locally by banks, insurance companies and other financial service providers. Regulatory systems like MiFiR, MiFiD I and II etc. would be fulfilled almost implicitly. Corresponding technologies for handling payment transactions, trading and clearing matters would be beneficial and would eliminate numerous intermediaries or several intermediary processes much more efficiently.

4.3.4 Safeguarding profits—more flexible and competence-based delivery models are to be taken more closely into account than currently

Interdisciplinary working methods are now almost ubiquitous. Nevertheless, in regulated sectors many areas are found in which market screening, business analysis, implementation responsibility, and monitoring functions are separated. The traditional separation of business from IT in many financial institutions perpetuates inefficient process design by not enforcing E2E responsibilities.

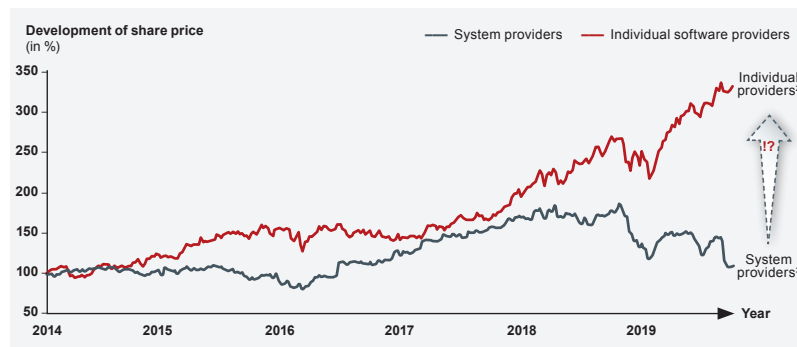
Skill and competence-based delivery models beat price-optimized models

Local optimization during the software development lifecycle because of siloed teams leads to functional, non-functional and fiscal trade-offs in the business functions as well as business analysis, development, test and deployment leading to competitive pressure from lean market participants.

While modern systems of IT technology companies come close to the ideal of zero ops, many aspects of the financial industry still require the middle and back office and extensive operating organizations, so that even without technical changes high run the bank/run the company costs are incurred. Even for successful banks, it is difficult to keep abreast of disruptors with their modern and lean IT in conjunction with regulatory requirements, the frequent system insufficiencies and high costs of changes brought about by an inefficient system design and development costs multiplied by network effects.

DevOps concepts are designed to avoid local optimization at the expense of operations by combining development and operations. This makes sense due to the experience that operating costs account for a significant share of the total cost of ownership in the medium and long term.

More effort should be made to ensure that interdisciplinary E2E functions gradually enter the product and process landscapes in order to meet customers' demanding requirements in terms of usability and process efficiency.

Relative trend in shares of selected IT service providers in the finance industry¹ (5 years)

Source: 1. Yahoo Finance; normalized on Jan 01, 2014 | 2. EPAM, Accenture, TCS | 3. IBM, DXC, Oracle

Fig. 20 – Market prospects between systematic and individual providers

Where this step is taken successfully and the first productive organizational and system components are available, the creation of a marketable, competitive and flexible ecosystem should be addressed. Management should focus on three main areas:

- › Third-party vendor management
- › Institutionalizing an effective retained organization
- › Sourcing & integration management for internal and external components (organizations, vendors, systems, products, processes etc.)

The result will be the institutional ability to shape and orchestrate a network economy, the mastery of which has gained existential importance in the financial industry.

Figure 20 shows the extent to which these concepts have also found acceptance on the capital market. It shows that established suppliers to the financial industry in the DACH region (IBM, DXP, Oracle) are increasingly falling behind globally active individual providers (EPAM, Accenture, TCS).

4.3.5 Next wave—future developments such as distributed ledger technologies (DLT) to be taken into account

While not of immediate priority, future developments in distributed ledger technologies (DLT) should be monitored closely. Scarcity of qualified human resources and the volatility of the technology basis currently dictate the usage only in niche applications, but even outside of these, some interesting concepts are emerging.

Distributed ledger (blockchain)
still beyond the horizon

The possibility of making intermediary processes more efficient and making partial augmentation and monitoring systems superfluous through cryptographic design offers great efficiency levers. There seems to be considerable potential for organizational disruption for financial institutions through these technologies, especially if legal boundary conditions are adapted to accommodate distributed transactions. For example, if DLT were to act as a distributed database, there would be no need to store data by all contractual parties separately, and the requirements imposed on separate auditing systems would be reduced significantly.

5 Conclusion

The multidimensional intensification of the competition for established financial institutions in terms of macroeconomic conditions, continued high regulatory pressure from and increasing customer requirements must be countered by means of active technology management.

Some of these requirements can be implemented individually, but the complexity resulting from technological sedimentation rises, which makes it increasingly difficult for financial institutions to master the three factors which are critical for success in the future: time, function and budget, especially if their dependencies are not taken into consideration.

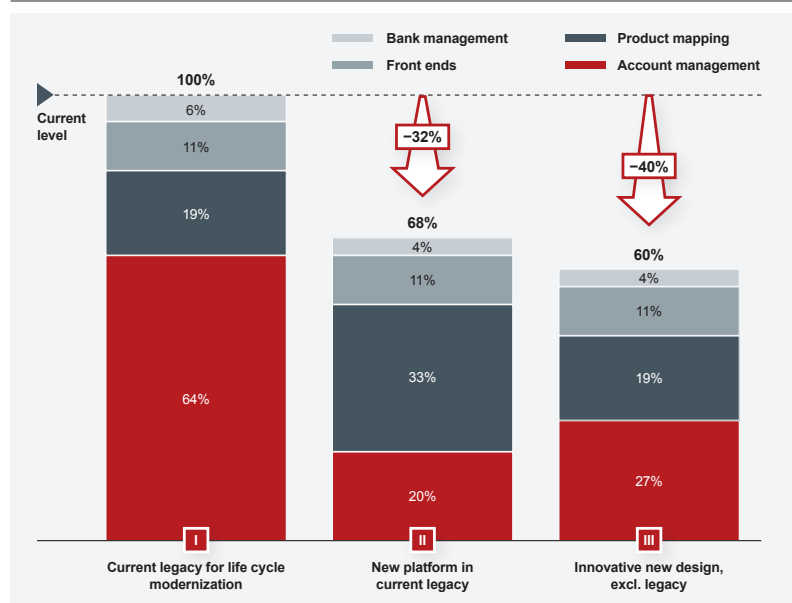
Where an integrated approach is to be applied—which we deem necessary—this requires extensive competence in the planning, design and implementation of complex IT architectures as well as modern forms of work organization across all hierarchical levels. These will have to face various current challenges that can no longer be postponed.

Furthermore, the market of providers for core banking systems remains highly fragmented and is subject to the same market frictions, which is why a solution to these fundamental challenges by more efficient and inevitably E2E-supporting processes is not to be expected by the established providers in the foreseeable future, but rather can be assumed to be an escalating conflict over dwindling profit pools between financial institutions and core banking providers.



<https://core.se/publications/white-papers>

Run-cost savings as a result of reforming the technology basis



Source: Business case assessment as seen from customers' examples based on three possible courses of action

Fig. 21 – Verifiable efficiency leaps (anonymized)

Solutions are created by an emancipated harmonization of strategic business and strategic IT requirements as well as the development of new Target Operating Models (TOMs) based on modern technological principles, which is why we recommend strategic business studies and decisions no longer be made without IT strategic feedback.

In addition, the technology basis must be renewed by means of defined and, if possible, standardized integration interfaces (APIs); moreover, more specialized market offerings in the technological solution space must be taken into consideration while at the same time shortening the technology lifecycle. To make this possible, supply chains need to be optimized, specialized service providers need to be identified and integrated into the company's own value chain in such a way that the added value of these service providers can be sustainably increased through cooperation.

Finally, we wish to point out that decisions in committees affected by technological aspects should strengthen their technical profile through internal or if necessary external competence in order to increase decision-making cadence.

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About COREresearch

As an independent technology think tank, we investigate the systematics of technology-driven transformations in industries with a high degree of IT involved in the value creation process. As part of our research activities, we analyze markets and technologies, address the structures, causes and mechanisms of technological change and curate results for clients and the public. Furthermore, we make available selected results of our interdisciplinary research in the form of comprehensive publications, case studies as well as lectures to a broader section of the public.

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