Giesecke+Devrient

CORE®

Putting banks at the center of consumers' digital universe

Maximizing opportunity
by optimizing digitalization

Putting banks at the center of consumers' digital universe

Across the financial sector and beyond, Digitalization is creating both challenges and opportunities especially for established institutions like banks. Competing effectively for customer loyalty remains more important than ever and one of the latest trends in digital disruption is the Super App: an all-in-one app that does everything.

Is this the direction in which the market is developing, or is it just another manifestation of the macro shift towards platforms and embedded finance? In an ever-evolving environment, how can banks remain competitive and deliver a seamless customer experience (CX)? This paper answers these questions.

How Banking is changing

The emergence and ubiquity of digital

Since the introduction of the smartphone in the early 2000s, the usage and acceptance of digital services has steadily increased, with an estimated 6 billion smartphone users in 2021. This figure is expected to rise further in the coming years, implying that most readers of this article are familiar with the concept of an app.

People nowadays rely on apps for everything, from keeping appointments and creation of new ideas at work to entertainment with the latest shows and monitoring our vitals. Of course, this is not limited to our smartphone, but affects many more areas of the world we are living in through wearables, voice, or gesture interfaces.

Inasmuch as apps have become ubiquitous, there is a subset of apps that aspire to be even more: all-encompassing – Super Apps. Indeed, this subset strives to keep users as glued to their offering (products and services ecosystem) as possible, providing everything from content, social interactions, and entertainment to shopping.

Rise of the "Super Apps"

A Super App today does more than provide users with a variety of functions and features. The main point is to become an integral part of the everyday life of a customer. The more relevant one becomes, the more data can be generated and used to become yet more sticky. (A concept which is sometimes faced with criticism under the term "surveillance capitalism".) Today this includes a range of features besides health and other data – such as an in-app currency that users can use to shop, book transportation or travel reservations, and send gifts to other Super App users.

The trend has been for Super Apps to grow from a relatively small app with simple goals, gradually adding functions over time until the app touches almost every aspect of the user's life. Information, entertainment, social contacts, but also financial services like bill payments, and even investments are all available within the Super App's closed but expanding ecosystem. Open APIs and the ability of modern apps to share data with one another have brought us to this point, and all indications point to even more integration and collaboration between discrete apps in the future.

As platforms, this vast access to data and deep integration gives a compelling value-add to the app and its users. It is easy to imagine a future where one day, every (remaining) app will be a Super App.

Super Apps now exist in varying levels of maturity across geographies and offer also more and more services out of the banking domain. There are a variety of companies which have claimed for themselves that their strategy is to become a Super App.

The Swedish payment company Klarna is one example, relevant for the European banking market. Grab (Singapore), Paytm (India), Alipay (China), Revolut (UK), Rappi (Latin America), and plenty of others are representatives of the incredible digital progress that has occurred in recent years. These Super Apps offer a slew of innovative financial services designed specifically for novel customer engagement methods in local markets.

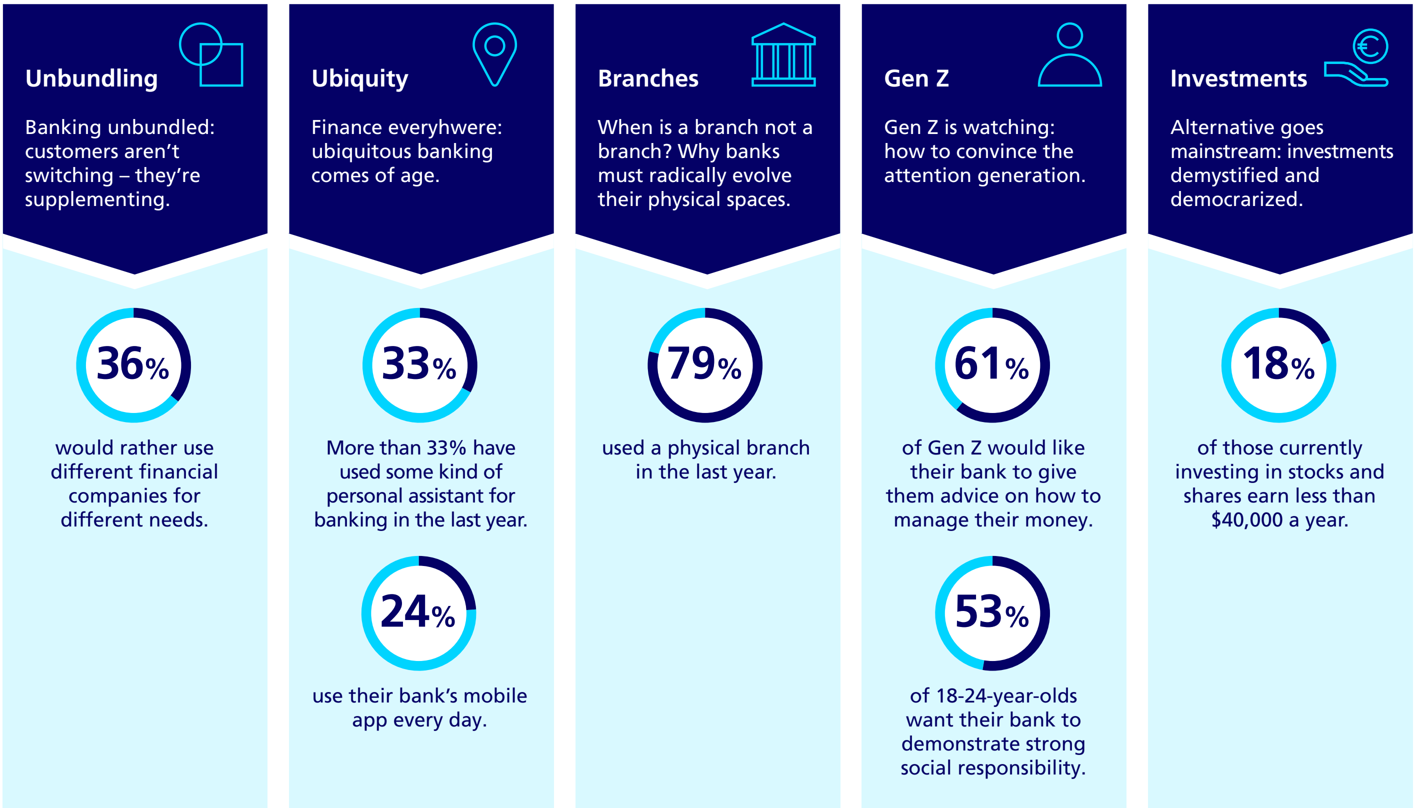


Figure 1 - Key findings from the EPAM Consumer Banking Report in 2021

Banking is changing a lot and so are customer needs

Based on technological advancements the banking business has changed completely and opened the possibilities for never seen digital banking features.

On the other hand, the burdens of legacy tech, high costs of restructuring and demanding clients seem to challenge the traditional banking sector. The Covid-19 pandemic accelerated the transformation of traditional established banks, while fintechs changed the market further into a highly competitive business field. Still, regulatory barriers keep the transformation of traditional banks to digital leaders slow.

In their portfolio banks are additionally facing the influence of changing customer demands and structures. Due to the difference in age, as well as the fact that new Generation Z clients embrace a more open minded approach, banking products and services must still be adjusted to fit the customers' needs.

For example, a young person would use a trading app with low costs for savings and investing and at the same time still be a client of their local hometown financial institution. Generation Z is more active and flexible regarding their financial situation and planning. As you can see in figure 1, 61% are still keen on getting professional advice on how to handle financials and what to do with their money.

This can also be seen in the trend towards ubiquitous banking, where at least one third of customers are using some kind or personal assistant for banking. On top of that, social responsibility in everything they do is an important matter for younger generations: 53% of 18- to 24-year-olds look for this in a bank.

The main question now is: What does a bank need to bring to the table to satisfy such a complex customer set? First, banks need to reconsider whether their current products can match those characteristics. Because banking customer needs have changed:

1. In more and more situations, classical standard banking products (e.g., like a credit card) are not a good fit anymore. Customers are instead looking for (financial) features which are deeply integrated into user journeys.
2. Banks are expected to offer propositions addressing core needs and not only traditional financial services.
3. Fully personalized services on every communication channel are required.
4. Consumers are more than eager to share data if they receive significant reciprocal benefits.
5. Clients' trust in the banks is high, making them comfortable entrusting banks with critical personal information.

A change of customer needs is a slow and steady process. Values and demands change with time and situation. Still this situation can be prolonged and accelerated due to certain circumstances.

All statements above are derived from the consumer banking report, which is based on a survey of about 21,000 adults aged 18+ in the UK, US, Canada, Netherlands, Germany, Hong Kong and Singapore. The survey was conducted between June 25 and July 5, 2021. Data analysis was conducted by EPAM consultants, undertaking cluster analysis to construct needs and attitudes-based segmentation of the audience, analyzing variations in motivation, attitudes, needs and expectations between each segment.

Android store rating of banking apps in Germany Q1 2022, by selected apps

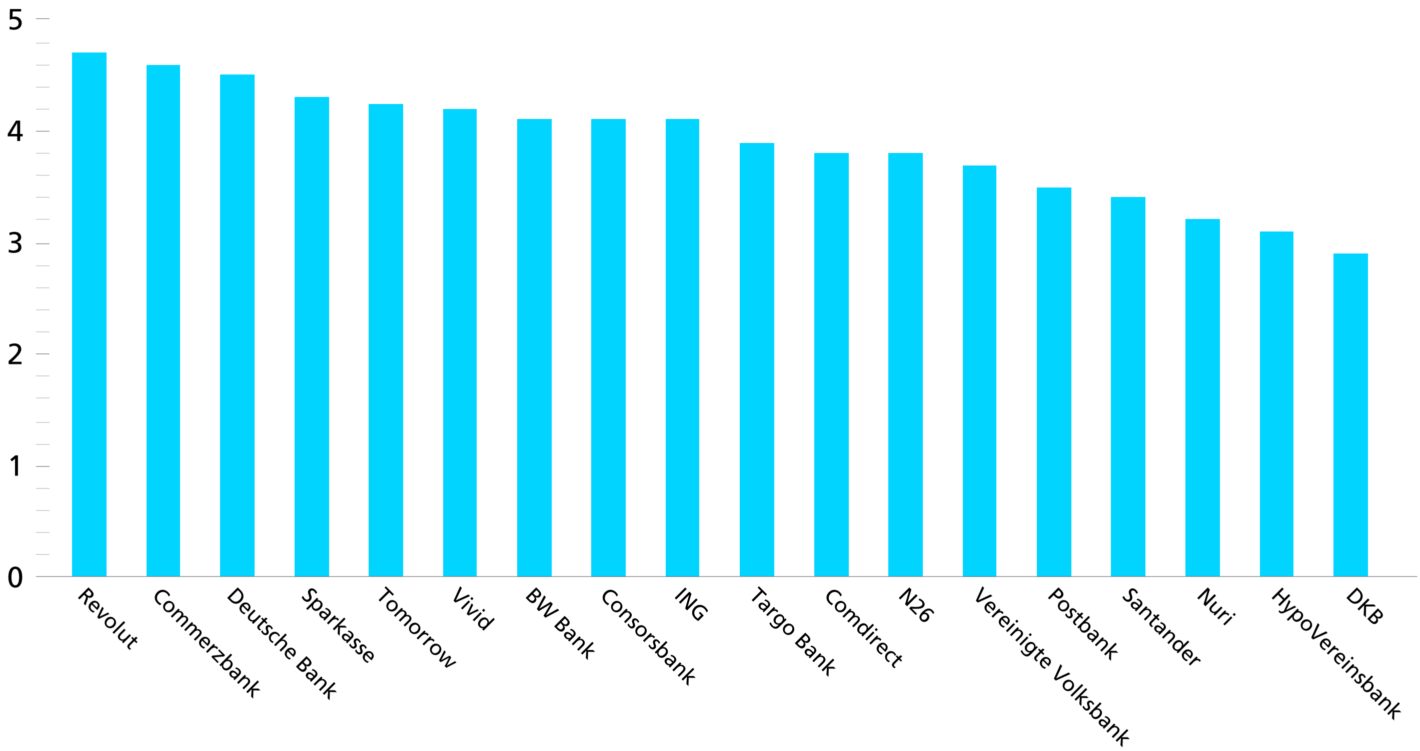


Figure 2 - Rating of German mobile banking apps in the android store by 2022 Q1

Neobanks are putting additional effort into shorter times to market, faster innovations, and simplified UX design

Due to lower legacy burdens, plus more flexible and often more agile infrastructures in their companies, fintechs develop products and processes faster, contrary to established institutions.

One example is the introduction of PSD2 in August 2018, with which Open Banking becomes more and more relevant and open APIs as well as offering services via third party platforms are as of today instrumental to growth. Besides new channels, great UX is key. As figure 2 illustrates, great UX and Customer Experience do not necessarily correlate with being a fintech vs. a traditional universal bank. One can also see that established institutions have invested significantly to stay competitive.

Payment as an indication for the future development of financial services

Although physical plastic cards are still in high demand, the mobile wallet is quickly becoming an important way to pay for goods and services as consumers are actively engaging with their smartphone in their daily life.

From the customer perspective, paying for goods at merchants with a smartphone has seen successful adoption and growth across many markets and this growth will even accelerate as figure 3 shows.

In most areas of the Western world, paying by smartphone has been driven by Apple, SAMSUNG and Google, who are without a doubt leading the charge for consumers together with card payment networks such as Visa and Mastercard. It is not uncommon in many markets to leave your plastic card in your wallet and use your smartphone (or smartwatch) to make a purchase at retail outlets. ´Tapping' your phone at the merchant counter has become a common sight, particularly in markets where contactless communication capability in terminals is prevalent.

Forecast on European tansaction value by segment in billion USD (US$)

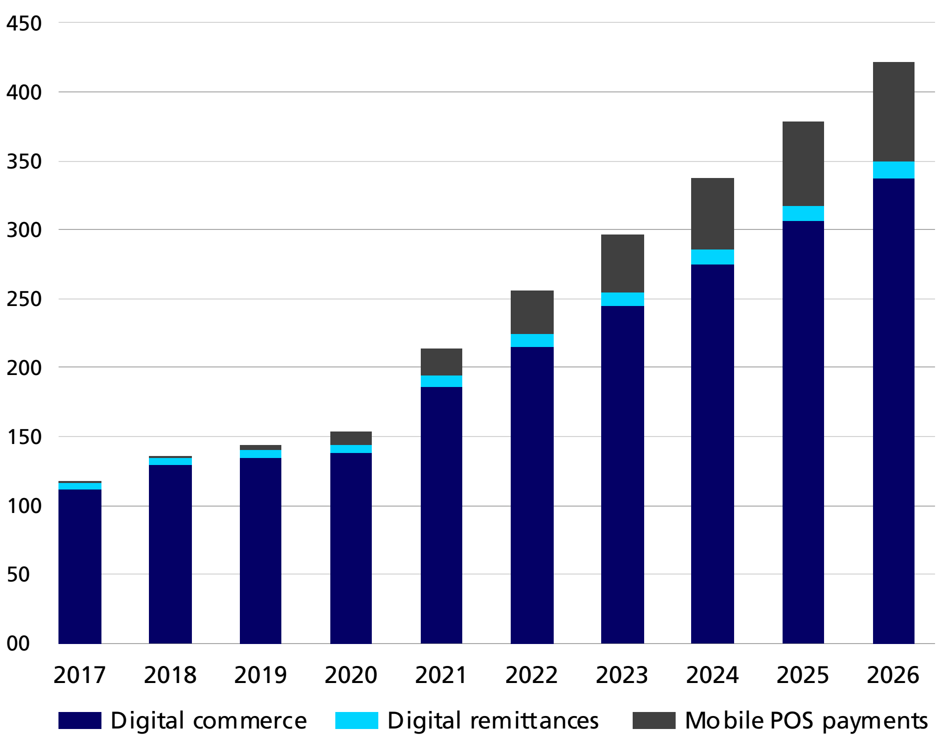


Figure 3 - Mobile and digital commerce are growing tremendously

The two dominant smartphone operating platforms from Apple and Google enable this capability in very different ways. Apple does not make the NFC payment capability available to any other party, which is deemed to be for security reasons. Google on the other hand has recognized and supported an NFC payment capability called Host Card Emulation (HCE) from the very beginning.

HCE is a secure yet open platform that is available not only to Google itself, but to other vendors such as Samsung. With such an open payment capability, NFC capable wallets are not just limited to device manufacturers. This is where some banks have seen the benefit of also being able to create their own wallet with NFC capability.

Apple Pay in Europe – is there an uprising opportunity for banks?

- In May 2022 the EU Competition Commission communicated objections to Apple and opens a preliminary finding that access to the NFC interface may have been unlawfully restricted. Commission Vice-President in charge of the case Margrethe Vestager, said: "[...] We have evidence that Apple has restricted third parties' access to key technologies needed for the development of competing mobile wallets for Apple devices. In our Statement of Objections, we preliminarily find that Apple may have restricted competition in favor of its own Apple Pay solution. Such conduct would constitute a breach of our competition rules."

- The discussion of legal levers to force Apple to open the NFC interface is anything but new: as early as 2016, a consortium of well-known banks in Australia tried to take legal action against Apple to force the opening of the NFC interface. In 2017, an investigation was launched in Switzerland by the Competition Commission with analogous accusations, while some Swiss banks joined forces for a strategic counter-initiative called TWINT, which in turn was criticized by Apple as being critical in terms of competition law. And probably the most prominent example of such lawsuits against Apple comes from Germany itself: In 2019, the so-called "Lex Apple Pay" was introduced as § 58a ZAG.

- And it seems also not to be the last one, as in July 2022 a class-action complaint was filed in a federal court in California by Affinity Credit Union. If Apple would really be forced to open the NFC interface, this could possibly result in far-reaching market movements in mobile finance. But the regulatory intervention should be seen in the context of the tendency of big techs like Apple, Google & Co. to successively open finance value chains.

- The so-called "xPays" of Google and Apple do not necessarily appear only as competitors, but also as (sometimes asymmetrical) business partners. And there is no doubt that the day that Apple devices can offer choice for payments, will be a great benefit to consumers, banks and the industry as a whole. Until then many banks in regions that do have a sizeable Android market are actively reviewing their strategy or engaging in projects to offer these enhanced experiences to their customers.

- Either way, banks should use the opportunity to reflect on their own positioning between cooperation and competition with xPays and to update their payments strategies.

This has resulted as of today in a fragmented landscape, where some banks see value in offering the choice to consumers when choosing their preferred wallet and others are solely offering Apple or Google Pay. An analysis can be found in figure 4.

Percentage distribution of payment transaction funds at Germany's 100 largest banks (>8 billion Eur balance sheet)

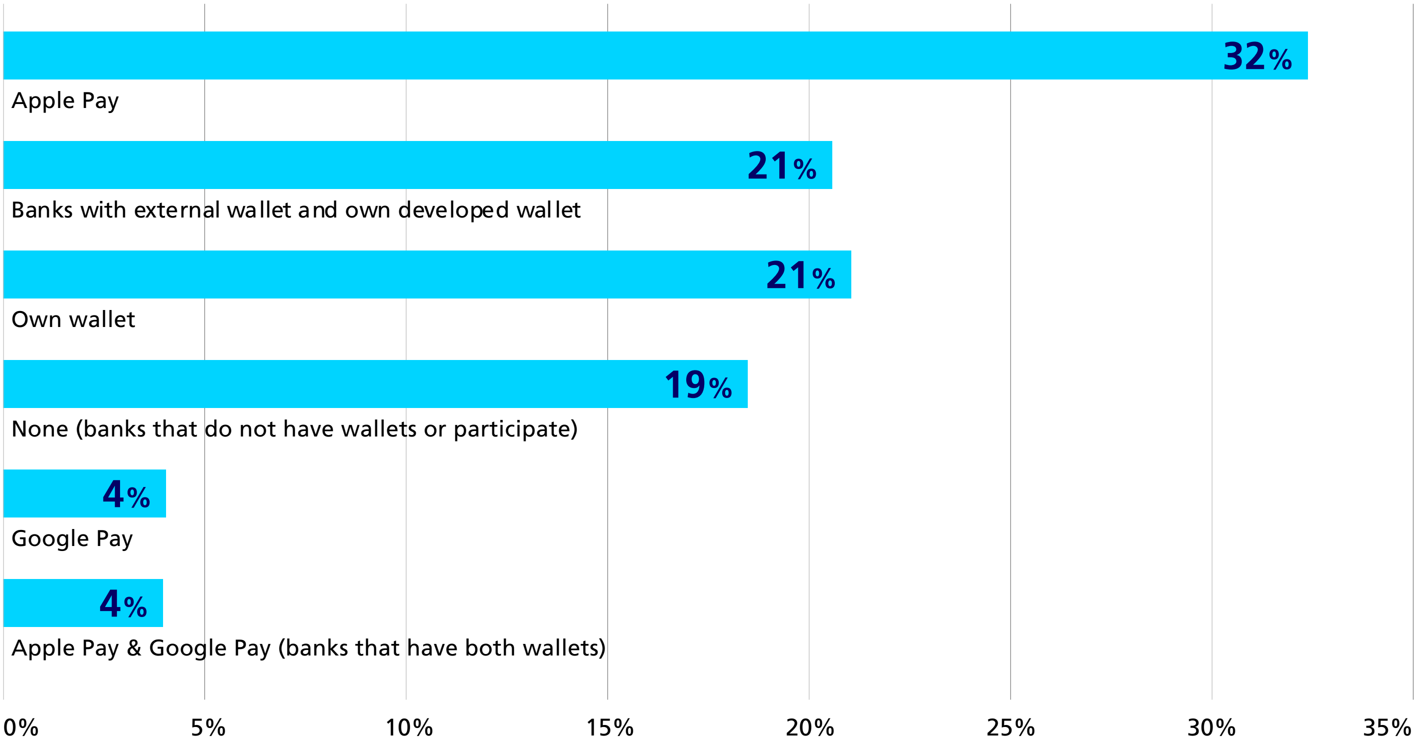


Figure 4 - Distribution of large German banks who are offering third party and own payment wallets

In many cases where consumers are offered a choice, they prefer to stick with the bank issued wallet. There are some logical reasons for this including trust and integration with other banking services they use every day in the bank's mobile application. An example of this may be as simple as having a quick glance at your current balance before you go on that spending spree! This underlines the fact that to gain competitive advatage and to be successful bank needs to have superior user-experience.

Which mobile payment solution do you use?

Survey on the use of mobile payments by provider in Germany 2020 (proportion of respondents)

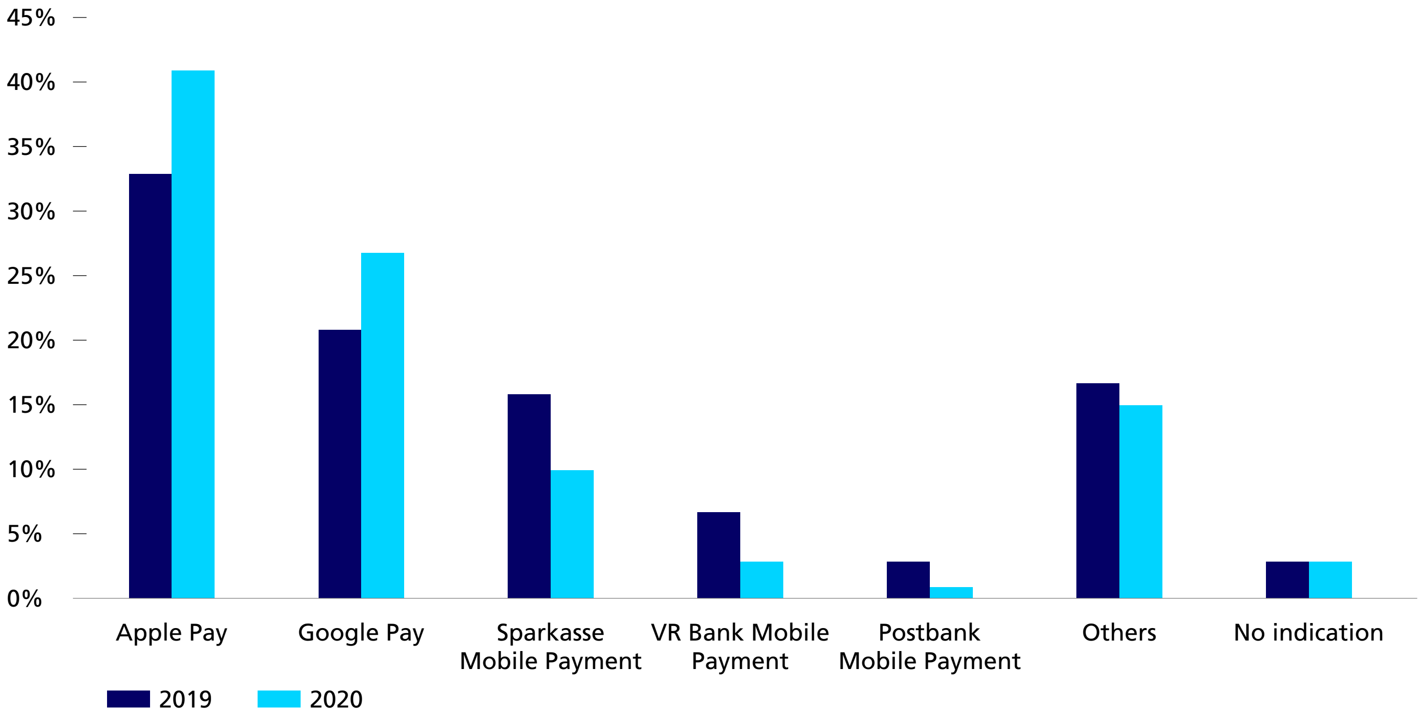


Figure 5 – Payment solutions by providers in Germany from 2020

Banks see value in enhancing their brand, identity, and loyalty with their customers. It is after all the bank that the customer has the primary banking relationship with, not necessarily the manufacturer of the phone.

Although some banks have opted on relying on the device platforms for their mobile payment needs, many banks are now reviewing this original stance for commercial as well as customer experience purposes.

There is a myriad of value-added capabilities when a bank issues its own mobile wallet. A simple example includes the ability to leverage the bank's partner relationships for benefits such as special offers and discounts to their customers.

All this creates business value to banks and more importantly creates an enhanced and valued experience for their customers. It is the latter that will drive continued loyalty to a bank and increased engagement for other banking services.

Mobile payments are only the beginning – the future is embedded

Nonetheless there are projects taking mobile payment to the next level. We observe many retailers becoming own regulated institutions, pushing the payment process far into the background – even making the payment process invisible, see figure 6.

Payments (and other financial services) are becoming more and more integrated into user journeys and the classical "one-size-fits-all" product will soon belong to the past. And of course, it does not stop there, but we will see further tremendous change, considering upcoming megatrends like the metaverse. Offering quite some risk, but an even greater potential for banks.

Development of financial payment services in Europe

The first PSD, the EU Payment Services Directive, was implemented in 2007 to support the development of a single payments market in the European Union and to promote innovation, competition and efficiency. In 2013 the European commission announced a restructure and renewal of these targets, in the form of PSD2.

Since this implementation in January 2018 the revised directive has been the basis for open banking in Europe including the United Kingdom.

In May 2022 the European Commission started consultation on the new regulatory bonding of PSD2 and to update this directive by drafting PSD3. The main idea of PSD3 is to develop Instant Payments and EU-wide payment solutions, which are cost efficient and promote customer satisfaction.

In detail the main targets are:

1. Promotion of cross-border European payment solutions
2. Developing a competitive and innovative payments market
3. Providing a better and safer payment infrastructure
4. Supporting the international role of the euro

The protection of payment fraud is another target prioritized on the agenda. Overall PSD3 aims to build a regulatory framework to unite different single-country-developed choices. In a nutshell, PSD3 is the next step for sane competition in the European financial industry to promote business and strengthen the customer.

Generally European banks and financial service providers are put under pressure through new developments in payment systems. Furthermore, the rise of Instant Payments and the establishment of new standards like "Request to Pay" are changing the market situation.

The e-commerce report of 2021 and the e-commerce market forecast described a significant rise of 25% of general usage till 2025. Despite the fact that 77% of all people in Europe have bought goods online at some point, Millennials are the biggest number of users by buying nearly every second item online. Still not every provider in e-commerce is a direct competitor. Certain aspects need to be fulfilled to be relevant as rivalry:

1. High security standards
2. Enjoyable customer journey
3. Safe and fast payment solutions

Of course, not all our purchasing takes place on websites and mobile apps. On the contrary, more and more POS payments are becoming e-commerce payments. Just take the Uber case: The customer is actually at the POS, but while exiting the cab, the payment is facilitated as an ecommerce payment (e.g. card on file), even as he is at the POS. And this is only one example. The trend shows that e-commerce will displace classic POS payment systems step-by-step.

Request to Pay is a standardized way to request a payment and initiate money transfer (account-to-account). This standard, combined with a Payment Initiation Service (PIS) and/ or an Instant Payment function would theoretically allow providers to bypass the whole classical 4-party payment system, because a card and the card infrastructure is not necessary anymore.

In a nutshell, there is a lot of change coming to the payments area, and these changes will be fundamental.

Amazon Go

Shopping journey without a cash desk and active payment authorization

- Check-in to physical store by scanning a QR code displayed in the app
- Do the grocery shopping
- Walk out of the store with the groceries

Due to standing authorization, payment is facilitated in the background via payment mean linked to the Amazon account.

Tesco GetGo

Check out free shopping

- Shoppers enter Tesco store via app
- Cameras and weight sensors track the items shoppers pick up
- After leaving, customer receives an invoice

By using cameras and sensors, the price will be calculated and after leaving the payment will be completed.

paybyface

Identity becomes payment instrument

- One-time authentication within the app
- Smile at the camera for face recognition
- The gate opens and customers walk through

Payment is authorized via face recognition, relying in the background on stored photographs to validate in-store payment.

Figure 6 – Payments become invisible

Super Apps and banking – a perfect match

How will Super Apps affect banks?

Super Apps integrate financial services into platforms to provide a seamless experiences for customers. For banks, this means an increasing number of users may bypass banking apps and simply use the more integrated Super App. Super Apps with digital wallets also make it easier for the users to stay in the Super App ecosystem and reduce their dependence on cash and credit cards.

Some banks have already adjusted and became a part of the Super App ecosystem, e.g. by providing unbranded "banking as a service"-type services to the apps, making a seamless integration possible. The regulatory framework around financial services is so onerous that many Super App providers simply don't want to navigate it themselves, especially across multiple markets and regulatory regimes. This means that Super App providers offering e-commerce, loans, insurance products, investing platforms and more are creating strategic partnerships with both banks and fintechs in their key markets to provide these services.

As the popularity of Super Apps grows, they could become a much bigger source of business or competition for traditional banks than neobanks or fintechs. By keeping users engaged with their platform, they could make it almost impossible for banks to convince customers to leave the Super App ecosystem to use the bank's standalone digital banking apps.

How is Open Banking powering Super Apps?

The rise of Open Banking around the world is enabling Super Apps to use financial data from multiple sources to target customers' needs and deliver financial products. This will give the platforms an even greater opportunity to provide a range of financial services and target the right services to each user.

Open Banking will power Super Apps by:

- Maximizing personalization: Open Banking creates an ecosystem that proactively helps platforms leverage customer data and create truly personalized experiences for them.

- Accessing everything on one platform: Once the Super App can use Open Banking data, consumers can make payments, check their account balances, monitor recent transactions and perform other traditional banking operations from the app's digital wallet, reducing the need to access a bank's own app.

- Enabling the use of advanced technology: Analytics, artificial intelligence, and machine learning can leverage Open Banking data to build customer-relevant products and foster a culture of data sharing and data-driven decision-making across the Super App's business ecosystem.

Impact on banks

Banks are still in quite a relevant position for their customers and have tremendous advantages, not only when it comes to the number of available customers or their experience of regulation.

In the following, we would like to briefly elaborate on these customer trends and highlight how banks could respond to them:

Trend	What does this mean for banks?
Fast moving, changing customer needs.	• Banks need to become key players in ecosystems that provide integrated offerings concentrated on customer needs. • They should strive to establish themselves as trusted advisors within an ecosystem of alliances, vendors, and partner organizations, each of which can provide a certain piece of an integrated proposition. • These ecosystems should aim to respond to "critical moments" in the life of consumers.
Fully individual treatment instead of standard service.	• You would imagine that all consumers appreciate a personalized touch from their banks, yet the extent to which people desire personalized services differs substantially – because each persona perceives and engages with banks differently! • Some want to receive personalized offers based on where they shop, some want alerts when they reach the threshold of their money spaces, and others may want personalized saving tips based on spending. It is personalized, yet in different shades. • Due to the variety of communication channels banks are forced to offer different ways to support client needs. This effort is leading banks to completely change their internal infrastructure and Customer Relationship Management (CRM) tools. Every client contact must be seen in a 360-degree perspective on account level. Otherwise, deviations and double contacting can occur.
Data in exchange for benefits.	• Data is at the heart of ultra-personalized financial services. The more information a bank can gather about a consumer while adhering to ever-changing and increasingly stringent privacy regulations, the easier it is to provide services that are relevant to an individual's specific needs. • Banks need to think in the perspective of a customer. What is his or her desire, where can banks leverage available data to create a real benefit for the end-user? By increasing these incentives to customers, customers are willing to provide data. After all, consumers are people, and people have cognitive biases. As a result, providing data feels like a loss, and if the rewards outweigh the losses, consumers' willingness to provide data for substantial reciprocal benefits increases to encourage customers to share their data. In many cases convenience is the key.
Consumers' trust in banks is high as they trust them with their critical personal information.	• As the competitive landscape is flooded with challengers and new entrants, banks cannot afford to rely on consumer inertia when it comes to switching, and competing only on price is not a sufficient competitive differentiation in the long run. • Many banks have recognized this and are focused on innovative methods to deliver added value to clients, such as personalization, an ecosystem of propositions revolving around core values. • Banking platforms that go beyond traditional financial products can benefit the ecosystem while also creating new revenue opportunities for banks in both corporate and consumer segments. To deliver this at scale, however, a lot of work must be done under the hood – business model rethinking for cross-industry coalescence, technology component redesign, financial supply chain enablement, etc.

How should banks position themselves?

In essence a lot is changing in the banking industry and developments in payment are just the tip of the iceberg, but generally speaking, banks have three options for responding to the rise of Super Apps:

1. Accept changes to the market and try to stay competitive by promoting primarily their own offerings.
2. Extend their reach by embedding services (possibly unbranded) within Super Apps, platforms, or even other digital financial services.
3. Compete head-to-head with the super-apps by launching their own wide-ranging Super Apps encompassing both financial and non-financial offerings.

The decision of which option to choose depends heavily on the individual starting point of an institution, its ambitions and capabilities, and further factors. But a few implications can be highlighted nonetheless.

Accept: Choosing option 1 will in the mid-term limit banks' growth, as a growing number of use cases cannot be serviced in the future, and this will lead to the target group shrinking (with this shrinking accelerating). Even if this effect will not be seen immediately, and well-established banks may be able to hold on to their market share because they are trusted brands with a large customer base and proprietary data, the effect increases over time.

Extend: Option 2 is the approach that quite a few banks are considering. There are banks which offer white-label services in the background and quietly generate significant revenue from them. But this will not protect them at the forefront of delivering seamless and secure CX. Others may continue to leverage their brand, using their platforms to create a smoother and more convenient customer experience. These digitally advanced banks may use their wallet as the core and approach other partners/services to attach these in order to build an ecosystem around it.

However, banks will need to act quickly or risk having no one left to partner with.

Compete: Option 3 will attract the boldest banks—those willing to reimagine their business model and adjust their vision to embrace the challenges of building an ecosystem of their own that delivers a seamless and secure customer experience. To compete with the rising and established Super Apps, these banks will need to

a) Establish a vision: Banks need to pinpoint what their role will be in this new era before undertaking the transformation to become a financial service or lifestyle ecosystem. Banks that don't carve out a defined niche could find themselves made redundant.

b) Embrace open data: Super Apps thrive on the free flow of information between entities. To compete, banks will need to explore open data architectures and application programming interfaces (APIs) too.

c) Become a data player: Banks will need to build data management capabilities like analytics algorithms and machine learning to unlock the value of their own data and third-party data and launch new user experiences and journeys.

Note that both options 2 and 3 require banks to identify partners, channels, and platforms through which they can offer their service, such as green dot bank. They also need a way to make technical upgrades. This becomes even more important due to the advent of embedded finance, and Request to Pay is only one topic to be highlighted in this context.

In parallel, rebuilding their channels (mobile, online, voice etc.) to leverage their strengths and remain competitive on the customer interface is key, as is the creation of relevant capabilities and a long-term strategy.

To remain relevant, banks need to quickly capitalize on this accelerated digital shift and redefine themselves.

» Banks can remain competitive if they strengthen their relationship with customers. This includes creating engaging and meaningful capabilities from their apps. When this is implemented properly, a bank's customer is more likely to adopt additional services from the bank.«

Alex Gatiragas
Global Head of Digital Solution Experience

In a nutshell, customer demands are changing a lot, the revolution in the banking, and in particular the payments sector is accelerating, and technological developments are allowing fresh possibilities for financial services being deeply integrated into customer journeys.

Banks are still advantageously positioned, but they will have to seriously (and quickly) adjust to stay competitive with new players and realize the broad potential of these changes. In payments it is not only about monetizing these developments, but also about remaining relevant in order to not lose the customer relationships and access to data they already possess.

Empowering banks to be at the center of consumers' digital universe

In this fast-paced world, consumers now expect digital payments to be the most secure and convenient way to pay – in any place, at any time, and from any device. To meet these consumer needs, the entire payment ecosystem faces the challenge of offering an intuitive and engaging customer experience.

Unlock new consumer experiences with seamless and secure digital payment solutions

G+D Digital Payment Solutions streamline your digital payment services, enabling you to focus on your core business so you can deliver a seamless customer experience across all stakeholders in the ecosystem.

Our core value resides in shaping trust in the digital world – and our strategic partner Netcetera, with digital in its DNA, strongly believes in creating digital trust and value. Together we are serving the growing demand for digital security and unlocking new consumer experiences with seamless and secure digital payment solutions.

G+D has 700+ bank clients globally, all major schemes as partners, best-in-class products, and 170+ years of serving financial services clients – ranging from long-established financial institutions to industry-disrupting fintechs.

G+D is the right partner to orchestrate your digital payments.

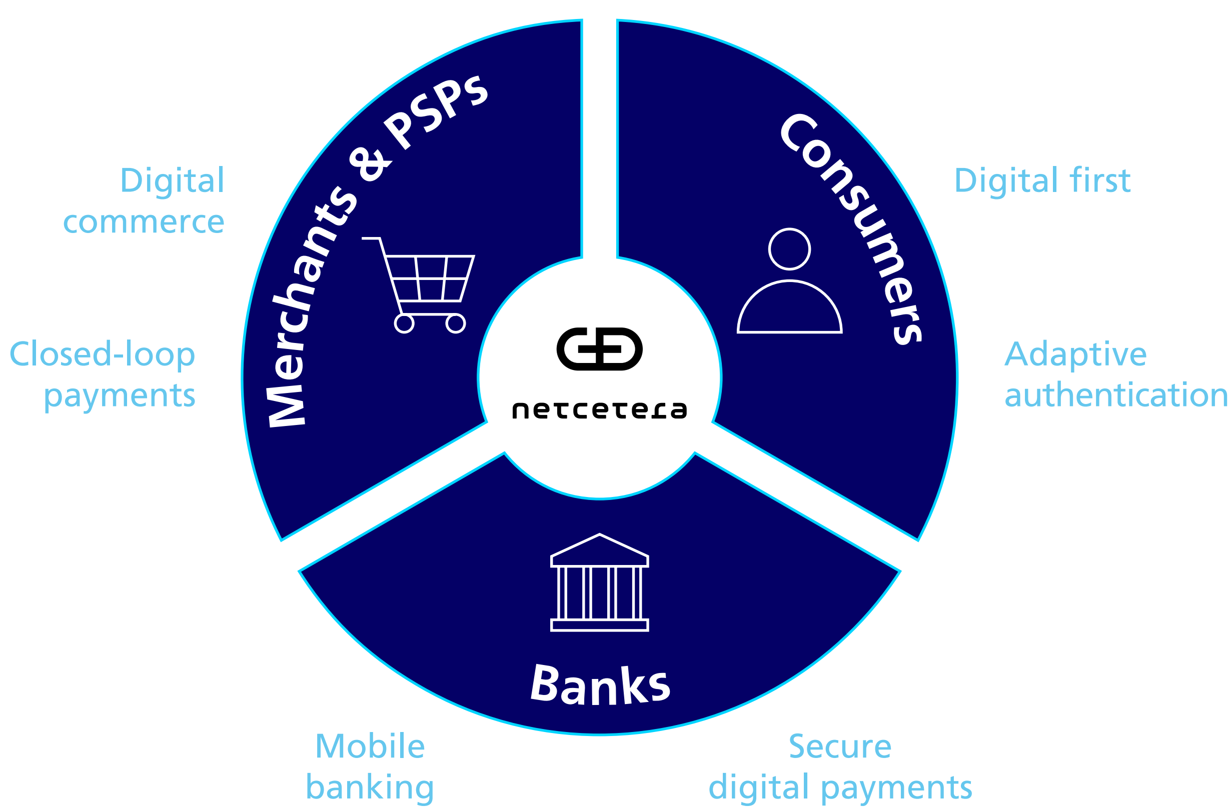
A range of digital payment solutions to stay top of wallet

Convego® CloudPay HCE
Enable EMV payments for your own digital wallet, supporting your bank's top-of-wallet strategy.

Convego® Token Cockpit
Enhance the capabilities of your mobile wallet, by empowering customers with the visibility and control of digital payment credentials.

Convego® Service Broker
Swiftly grant consolidated access to all networks and token requestors, Wallets, Merchants, and Devices.

ToPay Wallet
Extend your customer relationship beyond mobile contactless payments, with a white-label mobile wallet solution.



About CORE

CORE is a Technology Think Tank and part of EPAM Systems. CORE is based on the following three principles:

Competence leads

CORE is a Technology Think Tank and accompanies the management of complex technology transformations of institutions – situations where IT constitutes a disproportionately high factor in business success. Based on detailed market knowledge, in-depth technology expertise, and high methodological competence, we develop solutions that secure the sustainability of our clients' value chains.

Thought leadership

The fast cadence of technology development confronts companies with growing challenges, often to a business critical extent. Dynamic changes in the markets require a high degree of adaptability on the part of companies, which is achievable only by continuous technology lifecycle management in step with modern organizational forms.

Trusted partner

CORE is a trusted partner for startups, fintechs, universal banking, and government institutions, especially in highly regulated industries such as finance, biotech, automotive, and aviation. Our actions are guided by the values of trust, performance, and expertise as a reliable and trustworthy partner in co-operation, focusing on high quality technology delivery with unparalleled professional competence.

CORE SE
Am Sandwerder 21
14109 Berlin
www.core.se

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About Giesecke+Devrient

Giesecke+Devrient (G+D) is a global security technology group headquartered in Munich. As a trusted partner to customers with the highest demands, G+D secures the essential values of the world with its solutions. The company develops technology with passion and precision in four major playing fields: payment, connectivity, identities and digital infrastructures.

G+D was founded in 1852. In the fiscal year 2021, the company generated a turnover of 2.38 billion euros with around 11,800 employees. G+D is represented by 81 subsidiaries and joint ventures in 33 countries. Further information: www.gi-de.com.

Giesecke+Devrient

Giesecke+Devrient Mobile Security GmbH
Prinzregentenstrasse 161
81677 Munich
Germany

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