

CAPCO

Journal

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Transformational

The Rise of the Interconnected
Digital Bank

Ben Jessel

APEX 2016 AWARD WINNER

FINANCIAL TECHNOLOGY

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Financial Technology

Operational

- 8 **Opinion: Time is Risk: Shortening the U.S. Trade Settlement Cycle**
John Abel
- 13 **Opinion: Where Do We Go From Here? Preparing for Shortened Settlement Cycles Beyond T+2**
Steven Halliwell, Michael Martinen, Julia Simmons
- 17 **Opinion: Seeing the Forest for the Trees – The Taming of Big Data**
Sanjay Sidhwani
- 20 **Development of Distributed Ledger Technology and a First Operational Risk Assessment**
Udo Milkau, Frank Neumann, Jürgen Bott
- 31 **Digital Finance: At the Cusp of Revolutionizing Portfolio Optimization and Risk Assessment Systems**
Blu Putnam, Graham McDannel, Veenit Shah
- 39 **Safety in Numbers: Toward a New Methodology for Quantifying Cyber Risk**
Sidhartha Dash, Peyman Mestchian
- 45 **Potential and Limitations of Virtual Advice in Wealth Management**
Teodoro D. Cocca
- 58 **Overview of Blockchain Platforms and Big Data**
Guy R. Vishnia, Gareth W. Peters

Transformational

- 67 **The Rise of the Interconnected Digital Bank**
Ben Jessel
- 79 **The Emergence of Regtech 2.0: From Know Your Customer to Know Your Data**
Douglas W. Arner, János Barberis, Ross P. Buckley
- 87 **U.S. Regulation of FinTech – Recent Developments and Challenges**
C. Andrew Gerlach, Rebecca J. Simmons, Stephen H. Lam
- 97 **Strains of Digital Money**
Ignacio Mas
- 111 **Banking 2025: The Bank of the Future**
Rainer Lenz
- 122 **Banks Versus FinTech: At Last, it's Official**
Sinziانا Bunea, Benjamin Kogan, David Stolin
- 132 **The Un-Level Playing Field for P2P Lending**
Alistair Milne
- 141 **Blockchain in a Digital World**
Sara Feenan, Thierry Rayna
- 151 **FinTech in Developing Countries: Charting New Customer Journeys**
Ross P. Buckley, Sarah Webster

The Rise of the Interconnected Digital Bank

Ben Jessel – Managing Principal, Capco

Abstract

A new innovation called the API (application programming interface) economy is enabling organizations, including banks, to build new services far more quickly and easily than in the past. Thanks to APIs, digital integration can be achieved as easily as a click of a button. This presents a unique opportunity for banks to build new digital experiences and offerings for their customers by digitally bolting together their own services with those of partner organizations to provide customers with a far richer set of experiences than they have been able to provide in the past. Furthermore, a number of leading banks are using this innovation to share their data and services with the public, creating an open platform that will enable a global

team of developers to build new applications on top of the banks' infrastructure. This will make it possible for banks to embed their services into the fabric of the next generation of mobile applications. However, this innovation also poses a number of threats to the banking industry. Firstly, digitally providing information on banks' products could lead to product commoditization. Secondly, as the API economy also blurs the lines between financial services and other industries, it also breaks down the barriers to entry for non-banking institutions, which will raise key questions for banks about what it means to be a bank and what their business model should be in this new environment.

INTRODUCTION

The nature of banking is changing. A new generation of tech-savvy digitally connected customers is looking to banks to provide more than just the narrow set of financial products that they have been traditionally offered in the past. Banks know that they must move away from being order-takers of commoditized financial products and reassert themselves as organizations that are relevant and indispensable to their customers in a digital age.

But it is hard for banks to make this change, because they are under enormous regulatory and cost burdens. Many banks run on old banking systems that were not designed for the digital age, which means that launching new products and services into the market takes time and can be prohibitively expensive.

Banks need to do something, as the current environment is not conducive to business as usual. Low interest rates across most of the developed economies, and in certain cases even negative rates of interest, mean that the returns banks receive from their traditional products tends to be low. In addition, customers are far less loyal to their banks than they used to be in the past, and are far more comfortable seeking out the cheapest deals and better online experiences, even if they are from their competitors. Increasingly, this competition is emerging in the form of well-funded agile fin-tech (financial technology) organizations in the payment space, account aggregators, new mobile banks, and even social and e-commerce giants entering banking (some examples are provided in Figure 1).

In this article, we explore how banks are fighting back to keep their customers by building new digital offerings that aim to provide customers with what they have been asking for; namely, products, services and tools that bring together not just financial offerings from the bank, but non-financial ones from other organizations. These services and tools mark a more intimate relationship with banks' customers, helping them in a far more holistic way than they have

been able to in the past. These new digital experiences will help their customers manage the big decisions and events in their lives, such as getting married, moving home, having a baby, planning further education, paying off student debt or planning wealth transfer.

We will introduce a digital innovation, called "the API economy," which is enabling banks to bring these new services to market in a way that is significantly faster and cheaper than ever before. We will also look at how banks are using this approach to establish themselves as digital banking platforms that can be built upon by a global community of developers who will be building the next generation of mobile applications, in the same way that Apple, Google and Facebook have achieved with their platforms.

This article also examines a modern technology architecture concept – called the two-speed architecture, or digital mid-tier – that enables banks to overcome some of the constraints of their ageing rigid banking technology that is held together by a "spaghetti" of integration that often prevents banks from being able to innovate effectively.

We will explore how this innovation creates opportunities for banks to pursue new business models, and penetrate higher growth market segments outside of financial services. Finally, we will review what the key characteristics are that make banks successful in architecting and delivering a successful strategy that harnesses the API economy.

CUSTOMERS TO BANKS: "WE NEED TO TALK ABOUT OUR RELATIONSHIP"

In the past, banking was truly personal. Previous generations were on first name terms with their bank managers and spoke to them personally when they needed help in navigating significant events in their lives.

Compare that to today when 75% of consumers in the U.S. consider their banking relationship as merely transactional, as opposed to a relationship that is based on financial advice and value added services.¹

A large part of the change has been because the dramatic adoption of web and mobile technology has shifted customers' expectations, enabling them to be more informed and self-directed. To put that

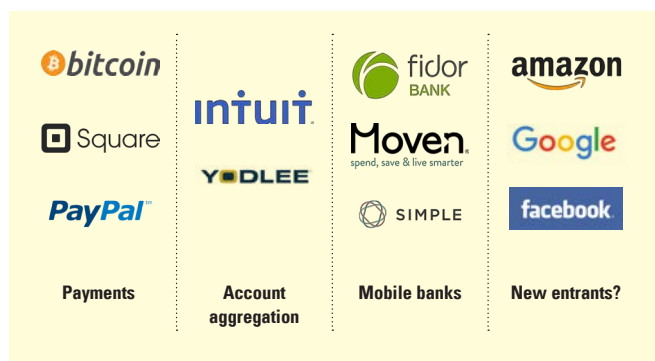


Figure 1 – New entrants challenging traditional banks

¹ <http://www.thefinancialbrand.com/PwC>

Customers want	Banks provide
<ul style="list-style-type: none"> • Services that are relevant to their lives • Access to services in their preferred channels • Support and help understanding their finances and making decisions • 24/7 availability and connectivity • Help to reach their dreams – everything is possible • Services to stay relevant as things change – evolve and adapt to their needs 	<ul style="list-style-type: none"> • The products and services they want to provide • Products and support through the channels they prefer • Advice and guidance on how to access their current services • Slow, unresponsive technology disconnected from the technology customers use day to day • No personalized help and support to customers • Services that appeal to older generations only that have not changed in decades

Figure 2 – The banking services gap

seismic change into context; since 1991, Silicon Valley has put three billion web browsers into the world² and nearly three million mobile applications into customers’ hands.³ Mobile has become ubiquitous, with adoption growing at a rate of 1000% since 2014.⁴

A particularly powerful aspect of modern applications is that many perform an aggregation role; instead of being tied to providing services and information from one particular organization, these applications aggregate from many providers. This is a fundamentally different model to what banks currently provide, but is one that customers have become accustomed to, and what they now expect from their banks (Figure 2). This in part explains why customers are increasingly shunning the limited and proprietary financial information and tools provided by their banks in favor of financial mobile apps provided by non-banking organizations.

These new apps not only provide powerful financial planning features that help customers prepare for major life events, but also perform this highly valued aggregation role that pulls together financial information, products and services across accounts at different banks, trusts and other financial institutions.

The aggregation can also be seen in the blending together of financial transaction services with social media; Snapchat and Facebook, for example, have integrated payments into their offerings. Stocktwits, a twitter like application that provides both stock prices as well as social media commentary around stocks, integrates with Robinhood, offering stock trading capabilities.

The banks’ ability to meet changing customer expectations and the emerging fin-tech challengers is constrained; there is limited investment available to put towards innovative customer offerings in today’s financial and regulatory climate and many banks have

core banking systems that were not designed for the world of the access-anywhere, anytime demands of today’s customers.

As will be discussed below, a new innovation called “the API economy” offers banks the opportunity to leapfrog their competition and overcome their technology and budgetary constraints.

THE API ECONOMY – DIGITAL LEGO BLOCKS FOR ONLINE SERVICES

In 2002, Jeff Besos, CEO of Amazon, issued “The API Mandate,”⁵ which meant that every team in the company had to expose their data and functionality through a “service interface.” This meant that all business units in Amazon had to be accessible digitally through an API, and had to publish, in a catalog, information about the digital services they would provide and how they can be accessed.

This put Amazon on a journey to become a “service oriented” organization. A service-oriented approach is a design concept involving architecting an organization in a way that provides business capabilities as discrete functional components that can be accessed digitally using common standards, allowing business services to be bolted together and orchestrated, in much the same way a child would build a house out of Lego blocks.

This approach can make an organization far more agile as it removes a lot of complexity around integration, whether it is integration between units within the business or between different organizations.

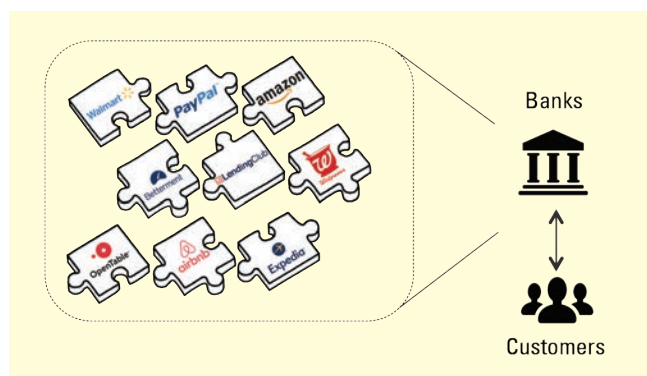


Figure 3 – Meeting customer needs

2 https://en.wikipedia.org/wiki/List_of_web_browsers
 3 <http://www.statista.com/topics/1002/mobile-app-usage>
 4 <http://www.ibm.com/middleware/us-en/knowledge/hybrid-integration/api-economy.html>
 5 <https://gigaom.com/2011/10/12/419-the-biggest-thing-amazon-got-right-the-platform>

Business and technology architects refer to the process of loosening and simplifying the tight bonds between organizations as “de-coupling.”

Individuals or organizations accessing business services through these service interfaces do not have to know what the underlying technology or business process is that delivers the service or even if the service is being provided from within or outside of the organization, they only need to be concerned with providing the right information when invoking digital service and having an appreciation of what the service will provide to them when invoked and what information, if any, they expect to receive back.

It is a hard concept to come to terms with, so let us illustrate the point with a business service that everyone is familiar with; Google. When you perform a Google search in your browser, you are digitally invoking a business service provided by another organization. A Google user has a clear expectation that if they enter a search term, Google will provide and send back data about information on the web that contains the search term. It monetizes this service through advertising.

The user does not need to know about the inner workings of how Google actually provides this service, nor do they have to integrate into Google’s business; the web provides that infrastructure already. They just need to know the web address to access.

A service-oriented approach is about architecting business services so that accessing them is as easy as performing a Google search. It is that simplicity that makes this approach so powerful. Furthermore, it is an approach that has gathered significant momentum over the years, to the point that there many thousands of organizations providing services in this way. This phenomenon is now so prevalent that the term “the API economy” has been coined as a collective term to describe organizations that expose their services externally through APIs.

The power of the API economy is that it enables anyone to quickly and cheaply create new offerings and experiences by digitally bolting together services from a range of API-enabled organizations, with API standards and protocols providing the digital “glue.”

Whereas traditionally, integrating with other organizations was a significant and expensive undertaking, now with the API economy banks can build new offerings quickly and simply by picking from a library of publicly available third-party services to integrate with. In some cases, integration is as simple as “dragging and dropping” the logos of API providers into an integration tool, and clicking “integrate,” proving that the process of business integration today can be as simple as clicking a mouse.⁶

Some of the 15,595 publicly available APIs⁷ have become the cornerstone of highly profitable companies. Uber, valued at U.S.\$62 bln,⁸ has been masterful at exploiting the API economy; Uber is underpinned by the marriage of a mapping solution (Google Maps) with a billing engine (Braintree), both integrated through APIs.⁹ Uber, in turn, has integrated its API¹⁰ with a range of other API economy organizations. For instance, if you book dinner with Open Table or fly with United Airlines you are reminded to book a ride with Uber as part of your reservation.

The payments segment has arguably led the charge in adoption of the API economy in financial services. Stripe, recently valued at U.S.\$1.75 bln,¹¹ is a payments provider that has API integration as the core component of its business model. It provides a payments infrastructure that is accessed through API calls and is used by household brands such as Open Table and Best Buy.

Recently, Stripe’s competitor, Dwolla, demonstrated just how dramatically the API economy can improve speed to market. Dwolla was able to integrate their white label bank transfer API into an Instagram ad platform using the Dwolla ACH payment API in two weeks with one developer.¹²

The API economy has become very profitable for some firms and many commentators and analysts believe that profitability accelerating. Salesforce.com, for example, generates half its U.S.\$2.3 bln annual revenue through its APIs.¹³ Analysts estimate that the API economy will become a U.S.\$2.2 trn market by 2018¹⁴ and that during the next two to three years the number of enterprises having an API program could rise by 150%.¹⁵

Shamir Karkal, head of open APIs at BBVA, a European headquartered global bank, appears to support this view by stating that “... right now there is some talk about [APIs], but in five to 10 years they will become a facet of doing business online that everybody has to do or end up being left in the dust.”¹⁶

6 https://medium.com/@dan_abramov/the-future-of-drag-and-drop-apis-249dfea7a15f-j1qj51gz4

7 <http://www.programmableweb.com/category/all/apis> (at the time of writing, not counting the proprietary ones that are not publicly advertised)

8 <http://investorplace.com/ipo-playbook/uber-ipo-valuation>

9 <http://getmondo.co.uk/blog/2015/11/05/why-api-driven-banking-matters>

10 <https://developer.uber.com/showcase>

11 <http://www.crunchbase.com/organization/stripe>

12 <http://www.dwolla.com/updates/case-study-instagram-ad-platform-leverages-dwolla-api-for-payouts>

13 <http://www.forbes.com/sites/ciocentral/2012/08/29/welcome-to-the-api-economy/-5d4ef2ea6d39>

14 <https://www-03.ibm.com/press/us/en/pressrelease/48026.wss> (IBM own estimates)

15 Ovum, 2014, “Realizing the business value of APIs,” October

16 <http://www.americanbanker.com/news/bank-technology/want-to-open-your-bank-to-apis-not-with-that-mainframe-you-dont-1080374-1.html>

It is no surprise that European banks are making waves in this area, considering that the European Union (E.U.) is a major driving force in encouraging banks to embrace the API economy. The E.U.’s Payment Services Directive 2 (PSD2), calls for banks to open up their APIs to third parties by January 2018, providing open access to regulated third parties to customer account information, transaction information, and payment initiation.¹⁷

EXPANDING HORIZONS – HOW THE API ECONOMY OPENS UP NEW MARKETS FOR BANKS

Banks have the ability, through the API economy, to integrate third-party services from outside the financial services domain and offer them to customers, which is what many customers have been asking for. Banks can monetize this in a number of ways, such as through referral fees or by offering paid-for customer and transaction data services.

This enables banks to enter a marketplace that is far larger, and potentially more profitable, than the financial services sector; the U.S. retail economy is approximately 20 times the size of the U.S. retail banking industry and is growing at a faster rate (Figure 4).¹⁸

Take mortgages as an example. Whereas traditional banks offer a mortgage product today, in today’s API economy-enabled world they can also build out a home buying solution that integrates many different services, such as assisting customers in finding properties through Zillow.com, attorneys through Legalzoom.com, removal firms from Moving.com, with a furniture recommendations engine that is tailored to the customer based on the buying behavior observed in their checking account history.

This offers an enormous opportunity for banks to build end-to-end planning tools, that can generate commissions for referrals to

third-parties such as brokers, attorneys, builders and removal firms. The CIBC’s Hello Home™ offering demonstrates how banks are starting to move up the value chain – in this case, with mortgages. In the summer of 2016, Chase, the consumer and commercial lending arm of JPMorganChase & Co., launched a digital car shopping and financing tool for its customers in partnership with TrueCar Inc., which provides a direct auto lending offering to its millions of clients in the U.S. as well as the ability for showcasing the vehicle inventory of key dealers in the U.S. The offering works by customers searching for a car and the platform presenting them with nearby dealerships that have the vehicle in inventory. Chase has about 14,000 dealerships in the U.S. on board.¹⁹ The customer completes the financing process online and the transaction at the dealership.²⁰

BANKING AS A SERVICE (BAAS) AND HEADLESS BANKING – STANDING ON THE SHOULDERS OF GIANTS

For some banks, building better integrated applications is just the first step in a much more significant journey. A number of forward thinking banks have realized that the API economy provides them with the ability to scale their digital footprint in a way that significantly exceeds what their financial resources would otherwise allow them to achieve.

These banks are looking to emulate the success of Apple and Google by building a platform and ecosystem that is similar to Apple’s App Store and Google Play. The App Store and Google Play are platform strategies that provide a global community of programmers and designers with a development ecosystem within which to write applications. This creates a virtuous circle whereby developers are incentivized to build applications for the platform and the platform becomes more valuable the more applications are built for it.

This is how Apple has been able to grow the App Store into a vault of over 1,500,000 applications in seven years with 1000 new applications coming online each day. This platform strategy is a major reason why iPad and iPhone are the compelling platforms that they are today.²¹

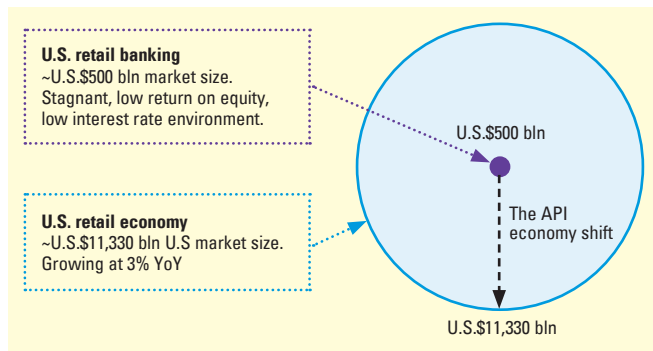


Figure 4 – Embracing the API economy to penetrate a market twenty times that of retail banking

17 http://europa.eu/rapid/press-release_MEMO-15-5793_en.htm?locale=en

18 <http://www.bea.gov/iTable/iTable.cfm?ReqID=51&step=1-reqid=51&step=51&isuri=1&5114=a&5102=1>

19 <http://www.businesswire.com/news/home/20160825006303/en/Chase-Launches-End-to-End-Digital-Car-Buying-Service-Customers>

20 http://www.autonews.com/article/20160829/FINANCE_AND_INSURANCE/160829877/chase-launches-direct-lending-with-dealers

21 <http://www.businessofapps.com/app-store-statistics-roundup>

In the same way, a number of leading banks are encouraging the global developer community to create applications based on services provided by their open banking API platforms. In this way, banks can ensure that their banking services can become increasingly embedded within the fabric of the next generation of mobile applications so that they become ubiquitous in the digital age.

Banks are betting that this strategy will create a virtuous circle; the more applications that are developed in the bank ecosystem, the more compelling the bank's offering becomes to its users and the better the bank will be at attracting and retaining customers. The more customers that the bank has, the larger the incentive for app developers to build on their platform, and so on.

Citi holds an annual "Citi mobile challenge," whereby participants are granted access to data and transaction services through its API gateway across a breadth of their bank, including Global Consumer Banking, Corporate Payments, Capital Markets Trading and Revenue Analytics, and Client Relationship Management. In 2014, Capco won "The most innovative social giving solution" with a mobile app that allows users to make micro-donations by "rounding up" credit card payments to the dollar and routing the spare "change" to charities and causes they have an emotional connection with.

Case study: Citi mobile challenge

This platform approach also reflects a far more realistic allocation of skillsets. Banks have now come to accept that the people with the skills required to build modern digital experiences are far more interested in working for startups than for banks. Far better, therefore, to have banks focus on what they do best – managing financial infrastructures – and leave the development of modern mobile digital applications to Silicon Valley-based organizations that can recruit and retain talent with technical and user experiential acumen.

For these reasons, U.S. banks like Citi and Capital One, European banks like BBVA, Credit Agricole, Fidor Bank and solarisBank as well as Indian banks such as Yes Bank²² are now pursuing this platform ecosystem strategy.

Fin-techs have a strong incentive to build on these banks' platforms as a key hurdle for these organizations has been the need to have a banking license and maintain core banking infrastructure, which is expensive. The platform approach provides a way around this. In fact, when Finleap launched solarisBank in March 2016 in Germany, it purposely marketed it as a "technology company with a banking license," with the primary objective of providing online banking services to non-bank fin-tech providers. In the process they coined a name for this approach "Banking-as-a-Platform" or BaaP.²³

At around the same time, Capital One launched its DevExchange API platform, which has been heralded as the first true open banking platform in the U.S.²⁴

While Spanish bank BBVA's API platform is still in alpha (available for experimentation to the public but in early stages of production readiness), it has in the past few years opened up its platform to provide a limited set of its services and anonymized transaction data for the purposes of hackathon events.

The BBVA Innova Big Data Challenge hackathon in 2013 was a potent demonstration of how API platforms can provide astonishing business scalability; BBVA provided access to anonymized data covering over 30 million transactions and 2 million cards used in 200,000 stores – a treasure trove of information.

Over two months, 780 developers across 19 countries participated in the event, making 6.7m calls to the BBVA API, contributing €2.9m of development time and resulting in 144 applications delivered. The value of the free development effort alone must have gone some way towards returning BBVA's investment in their open API platform.²⁵

BRINGING BANKING TO MILLENNIALS

For BaaP to be effective, it has to address the challenge of millennials, a significant segment of the banking customer population that has a high degree of mistrust of banks and is far more likely to use a pre-paid card than to have a bank account. In a recent poll, 22% of millennials stated that they that would never open a bank account²⁶ and 71% stated that they would rather go to the dentist than listen to what their bank manager has to say.²⁷ No wonder, then, that the two youngest adult generations in the U.S. account for 80% of U.S. prepaid card owners.²⁸

Millennial banking and the underbanked is a key focus for Capco, which is why we created a proof of concept to demonstrate the feasibility of using the API economy to build a mobile digital bank that can be based on a pre-paid card, instead of a checking account, while providing the standard features and functionality of a checking account (Figure 5).

22 <https://www.finextra.com/news/announcement.aspx?pressreleaseid=62030>

23 <https://www.finleap.com/pr/pressrooms/show/124131/finleap-creates-powerful-fin-tech-ecosystem-with-solarisbank?locale=en>

24 <http://www.programmableweb.com/news/capital-one-launches-first-true-open-banking-platform-u.s./2016/03/11>

25 https://www.abe-eba.eu/downloads/knowledge-and-research/EBA_May2016_eAPWG_Understanding_the_business_relevance_of_Open_APIs_and_Open_Banking_for_banks.pdf

26 <http://www.bankingmyway.com/save/savings/gen-y-says-no-thanks-banks>

27 <http://www.millennialdisruptionindex.com/>

28 <http://www.businessinsider.com/the-rise-of-reloadable-prepaid-cards-could-affect-the-way-millennials-approach-banking-2015-11>

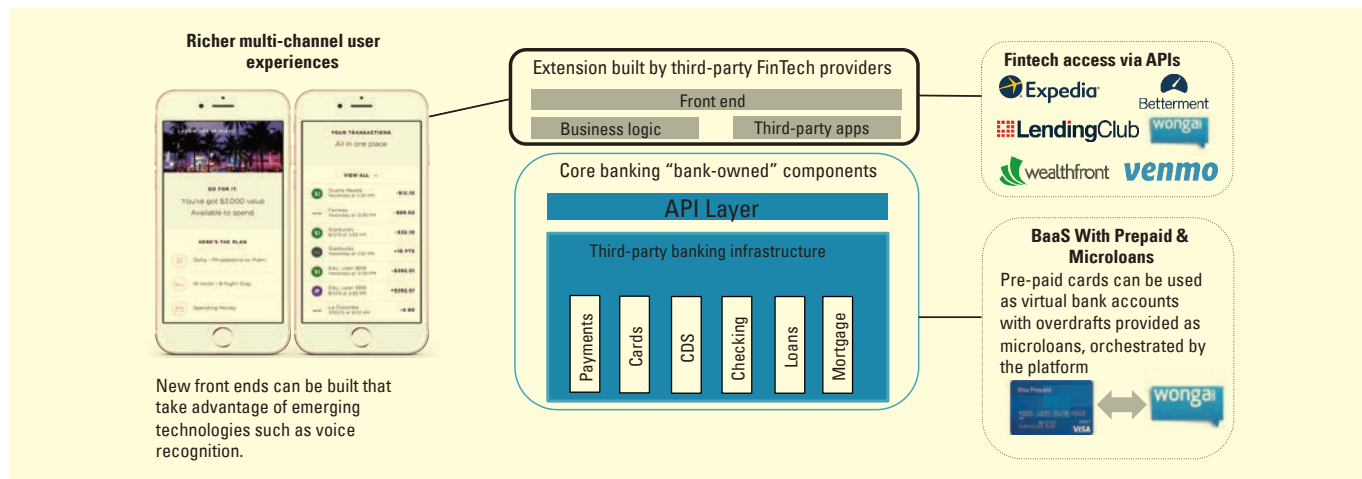


Figure 5 – Headless banking/banking as a platform

We built a front end that was a chat-based user interface that used artificial intelligence, and integrated this into a publicly available API of a prepaid card provider, enabling the user to move money to and from the pre-paid card, make payments, and check balances. We used an API economy-enabled lending platform, “wonga,” to provide on-demand micro-loans as an alternative to an overdraft facility. We also integrated flight shopping features to enable the customer to financially plan for – and book – a vacation, all through a single mobile app.

One of the key advantages of this approach is that it reduces some of the frictions inherent within the account opening process; a pre-paid card requires far less information to be collected about the user than a traditional bank account.

Not only is that attractive for millennials who have no patience for form filling, but it also makes it possible to better serve the underbanked segment. This segment tends not to be able to meet some of the account opening requirements of a traditional bank account, such as identity documents or in certain circumstances even a fixed abode. With this approach, this group can be provided with services that are just as good – if not better – than a checking account. Lack of FDIC insurance is a limitation with this approach, but not one that is particularly relevant to the user segment that this proposition targets.

ENABLING THE API ECONOMY WITH A TWO SPEED ARCHITECTURE AND DIGITAL MID-TIER

For banks to open up their data and services via APIs is not a trivial undertaking. A bank that chooses to expose its APIs to the public needs to be able to provide a reliable infrastructure that can be updated frequently with new features. Yet many years of acquisition, point solutions and custom development has created a mess for banks with a mishmash of siloed applications tied together with complex “spaghetti” integration.

In addition, core banking systems were built for internal bank operations and stability, as opposed to digital channels that are customer focused and need to be updated frequently. A model that is gaining traction, that enables banks to overcome these challenges, is the “two-speed architecture.” Also known as the “digital mid-tier.”

The two-speed architecture is about making it possible for banks to have an agile digital capability without the need to make changes to core systems every time a new digital feature or service is introduced.

It does this by separating a bank’s systems into a set of discrete conceptual layers and within these layers (such as a presentation, channel and core banking layer) packaging functions and features into individual modules that communicate through each other in a manner similar to that of the API economy – through de-coupled service interfaces. These components are called “micro-services” (so-called because each unit provides a small, discrete feature of an overall business service) and can be integrated and orchestrated to form an end-to-end composite business service.

USER EXPERIENCE									
Presentation	Browser		Mobile				Wallet		FinTech
	Browser	UI extensions	iOS native app	UI extensions	Android native app	UI extensions	UI extensions	UI extensions	Third-party apps
	Responsive web		iOS UI framework		Android UI framework				
	Responsive web UI framework								
Channel API	API GATEWAY PERIMETER CONTROL (NETWORK AND API MANAGEMENT)								
	Channel business services API				Channel foundational services				
	Form factor tailoring	Data filtering	Date aggregation		Security			Configuration and content	
	Banking channel services		Other channel services		Content management			Cross-channel support	
	Integration banking service adapters		Other service adapters		Logging			Messaging	
Business services	BUSINESS SERVICES INTERFACE								
	Simple services		Composite services			Orchestration services			
	Banking business services				Other enterprise business services				
	Core banking system adapters				Other enterprise system adapters				
Enterprise application	Customer	DDA	Payments	Product master	BPM		Cross-channel support		
	Lending	Cards	Wealth	Security	BI & analytics		Ancillary/other		
Other apps	Email	Document management		Image processing			Other support applications		

Figure 6 – Activating an omni-channel architecture built around a digital mid-tier

Separating functionality into micro-services allows new services and functionalities to be introduced in a way that isolates the changes to a small area of the banking platform – changes to presentation of services can be made in a presentation layer of the architecture, which is isolated from core banking systems in the core banking layer. Furthermore, the bank’s technology can be completely agnostic to whether micro-services are being provided by the bank’s internal organization or externally.

Minimizing integration and driving modularity like this not only reduces risk but also the cost of building new services for banks.

Whereas, previously banks often had to do “open heart surgery” on their core banking platforms to build and integrate services, the ability to modularize services means that it is possible to limit changes to smaller discrete set of components on parts of the banks’ systems

that are ring-fenced from their other systems, such as their core banking systems. The risk of breaking things in the bank, when introducing changes, the argument goes, becomes confined to the risk of a small feature failing as opposed to introducing a system-wide issue that takes down the whole bank. Far better to introduce a change that temporarily breaks the bank’s online transaction history search feature than having it bring down the whole digital self-service channel in its entirety.

The ability to introduce new features quickly while minimizing risk is key – banks’ internal change processes are geared towards introducing new features infrequently within quarterly release windows. This is the antithesis of the approach used by modern digital organizations. Digital commands a far higher velocity of change with customers expecting new features to be introduced on a far shorter timescale; weekly and in some cases, daily.

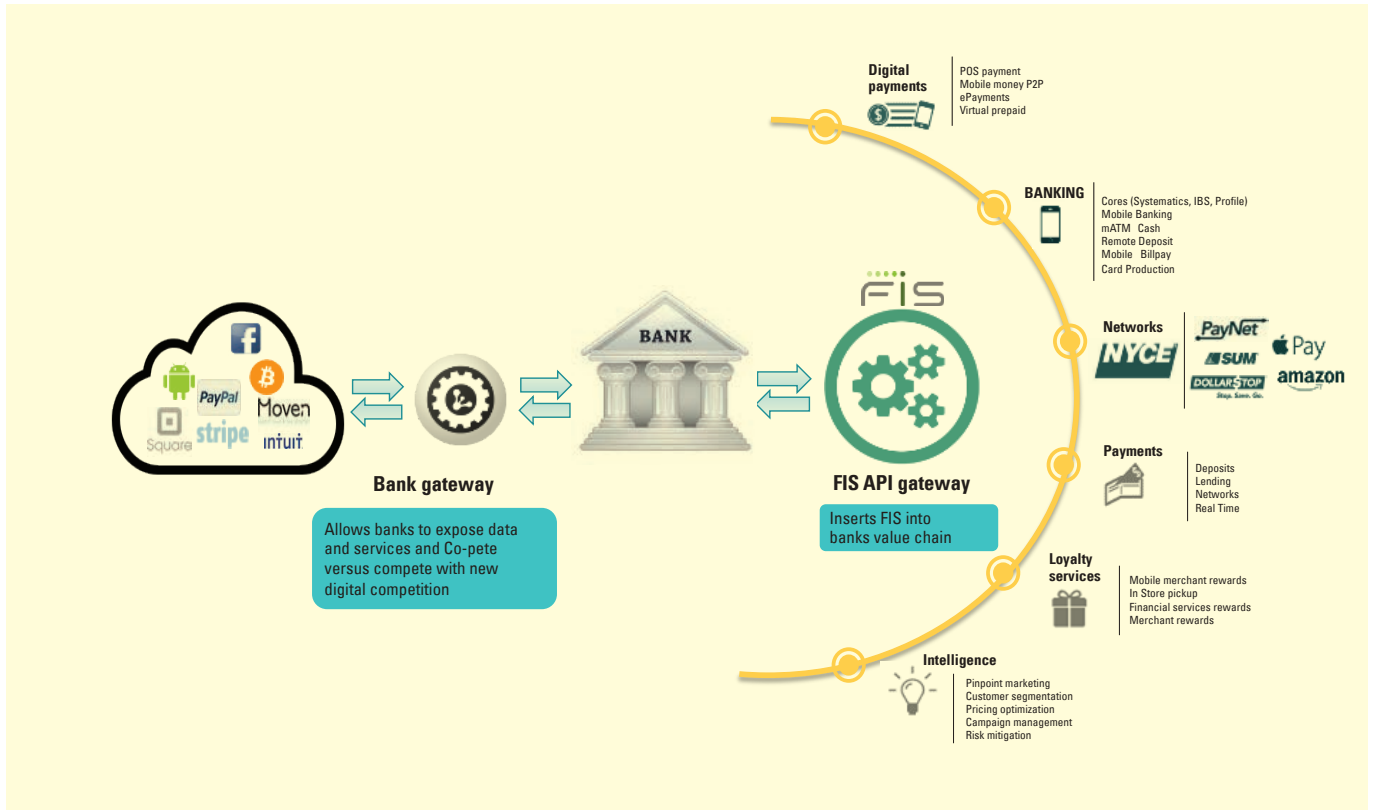


Figure 7 – FIS API gateway

The two-speed architecture’s approach to isolating banking and digital technology enables the bank to simultaneously work to the long timelines associated with core banking releases while also being able to pick up the pace and introduce new digital features on a far more compressed release cycle.

A key benefit to breaking down functionality and features into micro-services is that it significantly reduces the extent to which new changes need to be tested, since rather than having to regression test every element of the banking platform to validate that a new feature has not introduced an issue, the only testing that is required is on the interfaces of the micro-service. Furthermore, this form of testing lends itself well to being automated through continuous integration tools (a core tenant of Development Operations, also known as DevOps), which further reduces the cost and risk of introducing new services.

THE BUILDERS OF THE NEXT GENERATION INTERCONNECTED DIGITAL BANK

The market for providing infrastructure and tools for the API economy has matured and entered into a consolidation phase, with established technology service providers acquiring API economy startups. In 2013, Computer Associates acquired Layer 7. Two years later, in 2015, Apigee went public raising U.S.\$87 mln for its API gateway product that is used by organizations such as Twitter, Netflix and AT&T. In 2016, Intel sold Mashery to TIBCO and Redhat acquired 3scale, another leading API provider. In the same year IBM acquired the API building software provider, Strongloop.

One of the most significant recent developments has been IBM’s announcement of its Harmony offering in 2015, which is a matchmaker for developers looking to develop APIs. It provides an intelligent

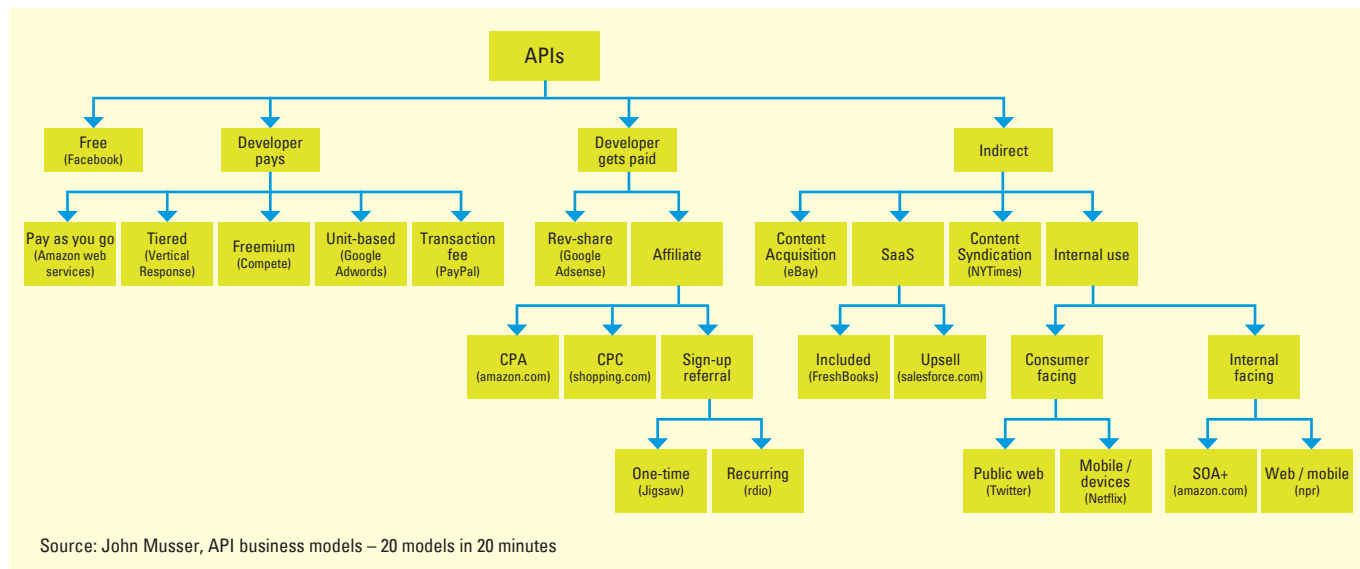


Figure 8 – Monetizing the API economy

cloud-based API matchmaking technology that enables developers to automate the process of finding an API to meet a given need, anticipate what a developer will require to build new apps, make recommendations on which APIs to use, show API relationships, and identify what is missing.

Another notable API economy provider, Swagger, has had significant success as both an open source specification and set of tools that standardize and accelerate the creation of API services and specifications.

In the fin-tech space, we are seeing major financial infrastructure providers unveiling new services that enable banks to integrate their offerings with fin-tech providers.

This year, Fidelity Information Systems (owner of Capco) announced the development of the “FIS API gateway layer” that intends to integrate its core banking products with the API economy. This will provide API economy enablement for many major U.S. and overseas banks, which to an extent will remove the need for many banks to develop their own in-house gateway.

AVOIDING THE PITFALLS OF A MATURING TECHNOLOGY

As with the advent of any new technological innovation, there are maturity issues that are in the process of being overcome around the areas of security, interoperability, and data privacy.

By exposing services to the outside world, banks risk unintentionally providing hackers with insights into their data structures and protocols as to how their systems and architecture works. Banks need to double down on efforts to secure their architecture.

Open source and API usage are the subject of ongoing litigation in the U.S. and other countries. Legal and regulatory rulings concerning protection of intellectual property, copyright enforcement, and fair use will likely have a lasting impact on the API economy. Banks need to understand what has been used to create APIs, what they are exposing, and how their data and services will be consumed.

While the API economy has been a key enabler of interoperability, there are few standards that are in effect today. The Banking Industry Architecture Network, the Open API Initiative (OAI), and Open Payments Ecosystem (OPE) have been driving forces in establishing new standards. As with any new technology innovation, there are tribal schisms around standards in the developer community (such as SOAP versus REST), but on the whole this has not impeded the progress of the technology as a whole.

TAKING A BUSINESS FIRST APPROACH TO ADOPTION

While the API economy is an innovation that has been borne out of technological innovation, successful organizations are the ones that approach it first and foremost from a business perspective.

Banks need to learn the lesson from the mistakes that were made when services-based approaches emerged in the form of the Service Oriented Architecture (SOA) movement in the 1990s. Then, many organizations rushed to buy SOA technology without having a clear overall services strategy in place. Many, later, became significantly limited by their chosen technology. This was a contributing factor to the movement ultimately failing to live up to expectations.

From a business perspective, the API economy is ultimately about an innovation that equips banks with the opportunity to be more expansive in terms of the markets they decide to participate in, the products they offer, and the customers that they seek to attract and retain (Figure 8). It gives them far more options in terms of how they monetize their services, be it in the business of selling data and access, generating referral fees from product recommendations, or through adopting a toll-gate model for developers building applications on their platform. How a bank will make money in this digitally connected world requires significant thought.

A key factor that is often overlooked is how this innovation changes the nature of the skills within the technology and business organizations of the bank. Whereas, in the past banks traditionally took requirements from the business and built systems with teams of developers, in the new world, where services can be bolted together with a click of a button, banks need to plan for a new type of employee that is a hybrid business analyst and API integrator.

The nature of service management also changes. In a world where the bank is supporting a service that is actually fulfilled by many other organizations, how do you effectively set, monitor, and manage service level agreements and triage issues?

Organizations need to rethink the nature of change. In the days when digital was nascent, banks approached change through the process of annual planning cycles and quarterly releases with technology teams tending to have an arms-length relationship with the business, communicating through functional specification documents. In this new digital paradigm, where time to market is so much shorter, banks will need to transform and become much more organizationally agile and internally integrated around change. This will require a new internal operating model and a different delivery culture. New internal operating models will need to support just-in-time funding, the ability to fail fast, with more tightly

integrated business and technology teams integrating in small agile teams with customer testing integrated into the process.

In addition to these technical and legal considerations is the issue of commoditization. When banks open up their platforms, they are essentially making it possible for information about their product rates and features to be aggregated digitally, hence enabling clients to compare their rates vis-à-vis their peers much more accurately and shop around for the best rates.

Whereas in the past customers tended to stay with banks even though they offered uncompetitive products, owing to inertia or lack of information, once customers are provided with data, and most critically tools that can remove frictions and potentially automate their allocation and selection of replacement products, banks may find themselves in a race to the bottom in terms of pricing. However, the genie is now metaphorically peeking its head out of the bottle, so banks may find a defensive approach becomes increasingly ineffective.

CONCLUSION

In this paper, we have argued that the advent of the API economy and BaaP provides a significant opportunity for banks to profoundly change the way they engage with customers and offer services that build far more intimacy with their end users.

We demonstrated how this innovation also poses a threat to banks by blurring the lines between industries, enabling well-funded non-banks with a younger, and more engaged user base to enter the financial space and augment their offerings with financial services.

As a result, banks will find it increasingly hard to operate in a pure financial services vertical and must innovate – potentially outside the financial services sector – to stay relevant. They will also be at risk of commodization as new aggregation services that offer bank rate comparisons and the ability to change products at the touch of a button become more prevalent.

Financial institutions face an existential choice and do not have the luxury of time that they may have had in the past. As we have seen with other technology led changes in industries such as transport and hotels with Uber and Airbnb, adoption has been far more rapid and change far more profound. Banks must, therefore, make a quick, but considered, decision concerning the model that they decide to adopt.

If they play offensive, they can embed themselves into the life of their customers, providing goods and services that transcend the

boundaries of the bank's traditional offering. They may decide that the increased loyalty that they will gain from their customers with this approach outweighs the risk of commodization inherent with opening up their platform.

Another approach is the platform/infrastructure play, whereby they focus on providing API services that will enable a global community of developers to weave their services into the next generation of applications, and that this approach is worth the risk of being relegated to the role of a behind-the-scenes core financial infrastructure provider.

Alternatively, they may play defensive by not opening up their environment, and instead rely on customers remaining because of inertia and lack of information. Although, as we have seen earlier, this may work for the older demographic, the younger generation are likely to vote with their feet, especially given the recent, albeit short-lived, foray by Amazon into student lending services²⁹ and Facebook and Snapchat's entry into providing payment services that integrate into their social platforms.

It is obviously the banks' choice which option they select, however, the speed of change has made the time they have to make these decisions less than it might seem at first glance.

²⁹ <http://www.forbes.com/sites/maggiemcgrath/2016/08/31/amazon-prime-and-wells-fargo-end-their-student-loan-discount/#242da4fb230c>

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