



WHITE PAPER

Emerging Technologies and Trends in Open APIs

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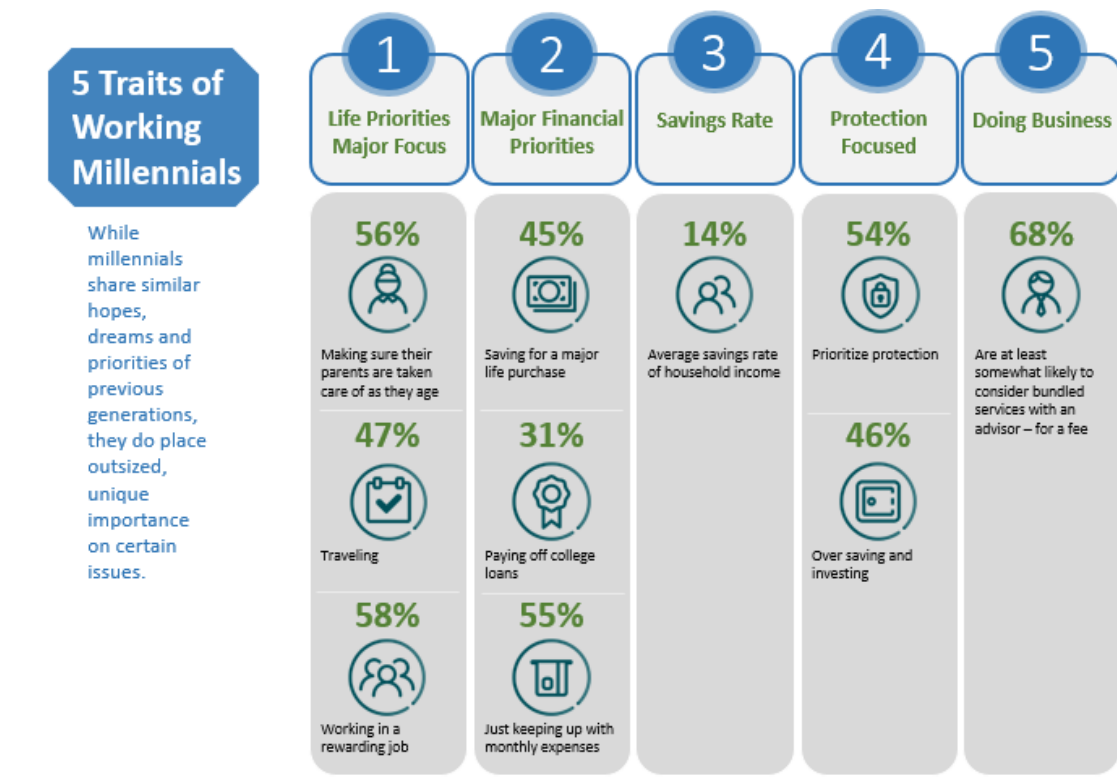
Introduction

Emerging technologies can become realistic solutions given the acceptance and advancement of application programming interfaces (APIs). This paper explores how millennials require a new type of solution, the banking landscape that provides fertile ground for APIs, and several types of emerging banking technologies. We also look at how these technologies can grow through proper application of APIs.

Millennial expectations for financial services require different approach

Millennials are the future of banking, presenting a more nuanced generation than their cultural stereotype. Some would say their future is now – within large fintech firms such as FIS, they are the largest segment of employees.

This diverse, educated and tech-savvy generation is already well-entrenched in the workplace. Maturing in the digital age, they expect greater ease of financial planning, immediate access to banking information, and to bank with firms that anticipate their financial needs. How do they differ from previous generations about financial planning, advice, priorities and dreams? The following graphic contains five insights on millennials' financial priorities to help answer those questions.¹



In addition, the following graphic from the American Banker indicates millennials choose a bank based on its digital services – yet they still have a strong desire for a traditional banking relationship with a financial institution.²

¹ Guardian Insurance, From Smartphones to Smart Planning, July 2018

² What Do Millennials Want from Banks, American Banker, March 2018



Equipped with this insight on this growing market segment's banking expectations, what primary technology will banks leverage to address millennials' requirements and desires? Enter APIs.

How APIs are shaping the banking landscape

Open APIs, along with the open platform banking they enable, change the way financial services firms develop products and respond to demanding market segments, such as millennials. Banks are opening their data and technology to fintech firms through API-based partnerships. And new products created with easy collaboration between innovative fintech partners and banks will better digitally serve this emerging population of bank customers.

Open banking with APIs not only leverages data held by the financial service providers, it also offers opportunities to foster innovation. New solutions will provide banks with new revenue sources in the form of license and usage fees. Collaboration between fintech providers and banks will grow revenue for both partners.

Banks are being forced to become less inhibited in their partnerships to thrive in the digital economy. Our survey shows that 44 percent of banks work with more than twice the number of partners than they did two years ago (compared to 36 percent in other industries).

Accenture, Building the Future Ready Bank, April 2018

Fintech firms enter these partnerships with big ideas, new technology and no "legacy" systems dragging behind them. Like other start-ups, they have a voracious appetite for knowledge and a fervent desire to collaborate with banks much larger in size. The influence of younger customers and tech-savvy customers – pushing for increased fintech and bank collaboration can't be ignored.

APIs are changing collaboration and the banking landscape, as they enable banks and their partners to create real-time, direct connections. With open web "public" APIs, a bank opens data, product catalogs, business processes, or other business assets to developers and third parties using the internet. The following sections of the paper describe current technologies now shaping APIs and then previews some of the emerging technology trends that will impact APIs in the future.

Current technologies driving APIs

In the 1990s, the need for the users to integrate and leverage on data was based on the distributed object integration and provided the basis of early APIs; they have evolved a long way in a brief time. As integration requirements increased in complexity, the technology landscape expanded to support integration across the organization. Frameworks such as Simple Object Access Protocol (SOAP) emerged.

SOAP uses service interfaces to expose its functionality to client applications. In SOAP, the Web Services Description Language (WSDL) file provides the client with the necessary information needed to understand what services the web service can offer. SOAP requires more bandwidth for its use. Since SOAP messages contain much information, the amount of data transfer using SOAP is significant. Hence, APIs have shifted from stateful into the concept of stateless (the server does not store any state about the client session on the server side) design. Representational State Transfer (ReST) provides the architecture pattern that requires less bandwidth when requests are sent to the server.

Some of the key differences between SOAP and ReST are indicated in the following table:

SOAP	ReST
SOAP is a protocol	ReST is an architectural pattern
SOAP requires more bandwidth for its use	ReST architecture requires limited resources and bandwidth
SOAP can only work with XML format	JSON is the preferred format, it can support XML, JSON, HTML etc.

When an organization is building or using an API, it must understand the overall context of the API. Developers must consider the following questions:

- What is the overall objective of building or using an API?
- What are the technology decisions needed to build APIs?
- How do these APIs fit within your enterprise business strategy and thus contribute to their ROI?

Technology trends can help shape the business strategies and drive the selection of APIs. Banks can consider developing a partnership with a fintech or a third-party technology provider. Emerging technologies provide means to access, analyze and accelerate underlying data that will enhance benefits to the end customer in an agile manner.

Emerging trends and technologies in Open APIs

Business strategies to bring innovative products, digitalization and improvements in the customer experience require APIs that leverage new tools and technologies. API tools have embraced open-source applications that smooth the API life cycle and allow banks to build APIs to meet their enterprise requirements. The following are emerging new technologies for banks and their API partners to consider.

Technologies to accelerate and expand API development

GitHub

GitHub is an open-source code repository hosting service allowing the distributed management of source code, version control, pull requests and commenting. It provides an effective means of managing and maintaining the code through specific documentation standards. API developers can store their code in private repositories. GitHub also provides a marketplace of apps for API developers to extend their offerings and a developer forum for them to exchange their views and ideas.

Postman

Postman has been evolving as an effective tool supporting a complete API development life cycle. Developers can use Postman to debug and run mock services. This technology helps developers publish APIs faster and provides documentation based on specific standards. It has a monitoring mechanism to create automated tests and monitor APIs for uptime, responsiveness and correctness.

GraphQL

Another technology becoming popular with API developers is the GraphQL query language. This tool helps them enable predictable results by creating a uniform API across an entire application without storage engine limitations. GraphQL APIs are organized in terms of types and fields, not endpoints, thereby enabling full capabilities of the data from a single endpoint. While the ReST-based APIs may use multiple URLs, GraphQL APIs get all the data the application needs in a single request, improving processing times and business functionalities.

WebHooks

To meet the increasing demand for real-time updates and instant and customized services based on certain events, another emerging technology, WebHooks, allows developers to build or set up apps that subscribe to certain events on the host provider. WebHooks can be installed at an enterprise level or in a specific repository and will be triggered each time one or more subscribed events occurs.

Sample scenarios of WebHooks driving event-based triggers include:

- Update a customer's membership record in a repository when a payment event completes.
- Alert a customer when a payment fails.
- Analyze a dashboard if there is a dispute that must be resolved.
- Provide an update on any specific transactions – such as debits greater than \$500.
- Alert a treasurer when an invoice is presented for payment.

Enablers of future APIs

The following technologies will serve to accelerate and expand APIs use within financial institutions.

Chatbots

These are programs that automatically engage with received messages and can be customized based on certain keywords and machine learning. They can adapt their responses based on multiple scenarios and are gaining good ground in automated virtual assistance to customer queries. Chatbots can be built and integrated around messaging systems, alerts, event subscriptions or social media platforms.

As per Facebook.com³, the acceptance of Chatbots has increased as indicated by:

- Two billion messages are sent between people and businesses monthly.
- 56 percent of people would rather message than call customer service.
- 53 percent of people are more likely to shop with businesses they can message.

A typical use case for creating a Chatbot for customer service includes:⁴



Voice Banking



Increasing penetration of mobile devices and voice recognition technology have provided options for interactive applications.

Voice banking and conversation banking based on increasingly seamless and connected conversations are defining a new medium for financial institutions to interact with their customers. Amazon (Echo and Echo Dot) and Google (Home) voice-based products provide the means for banks to reach into the homes of customers for providing financial services.

³ Facebook.com, August 2018

⁴ SproutSocial.com, August 2018

Voice banking will become an important component for fintech providers and banking organizations, and APIs can serve an active role by providing seamless integration to mobile devices and building requisite skills for voice-based devices. It is imminent that touch-based and online-based banking will need to give room to voice-based banking, though the journey has just started.

Emerging technologies that are closer than you think

Augmented and virtual reality

Augmented reality is an enhanced version of reality that is created using technology to superimpose digital information on an image of something being viewed through a device (such as a smartphone camera). While virtual reality is an artificial environment experienced through sights and sounds provided by a computer, and in which a person's actions partly decide what happens in the environment, augmented reality superimposes computer-generated images to change users' views of their world. This technology could ultimately offer banks these benefits:

- A virtual immersive experience for customers moving from “physical” banking to “virtual” banking
- Engagement with millennials to provide total digital experience
- An ability to help customers visualize banking products, transactions and key data points – providing an alternative to dull statements/brochures/sales demos
- Enhanced personal experience for customers to build excellent brand recall value
- A source of interactive sales demos/brochures/customer support using “avatars” and “virtual actors” – blending banking with innovative technology
- Data-driven decisions that will be agile using digital visualization tools

APIs as a service

Business Service

Business services provides a single, bundled API that fulfills a given use case or workflow for the bank such as deposit account boarding, loan boarding, etc. Business services act as a wrapper created on a set of services that enable developers to call the host and fulfill the functionality through a single-commit process. It provides easier integration for businesses across enterprise applications hosted by different service providers. Business service APIs have proven to be suitable for Agile-based integration as well as a cost-effective mechanism for consuming large volumes of services.

Microservices

Microservices allow the business or application logic to be sliced into smaller components that can either act between them and/or be exposed through an API. As an Agile development approach drives faster and focused development on modules, rather than a whole application, microservices provide the needed flexibility to focus on specific components. They help create scalable, testable software that can be delivered more frequently rather than over a longer duration. The following table describes the benefits of microservices:

Benefits	Description
Simpler to deploy	Deploy in literal pieces without affecting other services
Simpler to understand	Follow code more easily since the function is isolated and less dependent
Reusable across business lines	Share smaller services across the business such as login or payment systems
Faster defect isolation	Due to isolation, it becomes easier for defect resolution
Minimized risk of change	Allow change on-the-fly without risk, since it is not tied to any technology

Event-driven APIs

As the demand for data grows, response time must be quicker; API architecture also needs to adapt to this change. Event-driven APIs enable these capabilities. Multiple events based on interaction points, channels and customers drive these interactions. Based on a subscriber's services, an event-driven API will let him/her know about various activities based on user stories built to meet the expectations of each business. The bank will need to define the enterprise-level events based on the various interactions across customers, services and channels.

Summary

Banking products and services will need to integrate and provide a seamless customer experience across omni-channels that will extend to social media and e-commerce platforms. APIs will intermingle with emerging technologies such as AI, Chatbots and voice-based assistants. Cost drivers, revenue generation and extending the customer base will be key drivers for banks using APIs. They can thus build innovative solutions to meet the growing expectations of a growing millennial customer base.

Contact Us

For additional information on IBS Open APIs, and the benefits banks derive from this robust tool set, contact Amit Aggarwal at amit.aggarwal@fisglobal.com, or call 414.815.1182.