Evolution of the API economy

Adopting new business models to drive future innovation

How IBM can help

In the era of cloud and cognitive computing, companies need to accelerate the adoption of innovative business models to remain competitive. How will they create customer loyalty that exceeds that of their current and emerging competitors? IBM can provide the expertise and technology to help organizations design strategies that put APIs at the core of their digital and physical businesses. For more information, visit: **ibm.com**/apieconomy.

A new form of business model innovation

In today's world of ever-expanding interconnectivity, application programming interfaces (APIs) have emerged as important tools for providing access to data and capabilities beyond the firewall. Organizations increasingly use APIs to bring together ecosystem partners and unlock new sources of value. To take advantage of these capabilities, companies must understand the forces driving API usage, as well as the potential business models and monetization strategies APIs can help create. Successful organizations will see APIs not just as technical tools, but as sources of strategic value in today's digital economy. This executive report, the first in a two-part series, focuses on these driving forces and evolving business models. The second report will explore the use of APIs as a new form of product offering, the API experience and underlying API capabilities.

Executive summary

The days of organizations operating as lone entities are quickly waning. In our increasingly interconnected world, companies are finding that collaborating with others can help them create new business opportunities, gain competitive advantage and foster innovation. According to our recent Global C-suite Study, more than twice as many CxOs recognize the need for external innovation as those that recognize the need for internal innovation.[1] One enduring theme emerged from the study: organizations realize they can no longer compete on their own. In fact, almost 70 percent are looking to increase their external partnerships. Companies are turning to APIs to help build these bridges to other organizations and unlock each partner's unique data and capabilities.

APIs enable organizations to share data and applications using easily accessible standards and platforms. They are more than basic tools for application developers and data scientists. They represent a new form of business model innovation, bringing together disparate functionality to create completely new customer experiences.

What's more, they redefine the nature of partnerships, allowing companies to participate in ecosystems without the traditional need for extensive negotiation and customization of information systems. In addition, they enable companies of all sizes to tap into services – such as cognitive computing and the Internet of Things (IoT) – that are too difficult, expensive or time-consuming to reproduce in-house.

In short, they are the new conduits through which future innovations can, and will, be realized on a global scale. The API economy – the commercial exchange of business functions and capabilities using APIs – has captured the attention of not only software developers, but strategists, marketing leaders and partnership executives seeking to move to the next level of marketplace differentiation.

Drivers for API adoption include:
Emphasis on the customer experience, desire for frictionless access to ecosystems and need for faster speed to market
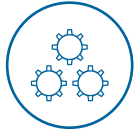
In the API economy, business models can be based on direct consumption, market-making endeavors and ecosystem enablement

API monetization strategies can be indirect, transactional or product-based

This executive report explores the key drivers and enablers of the API economy, as well as the new business models and monetization strategies that have emerged from it (see Figure 1). Our findings are based on interviews with over 30 individuals representing companies across industries (see "How we conducted our research" on page 14).

Our research revealed that APIs enable innovations, ranging from internal process improvements to establishment of entirely new markets. In turn, these business models yield enhancements, such as process efficiencies, cost savings and new revenue streams.

Figure 1
Four factors influencing the API economy

Drivers

Business models

Enablers

Monetization strategies
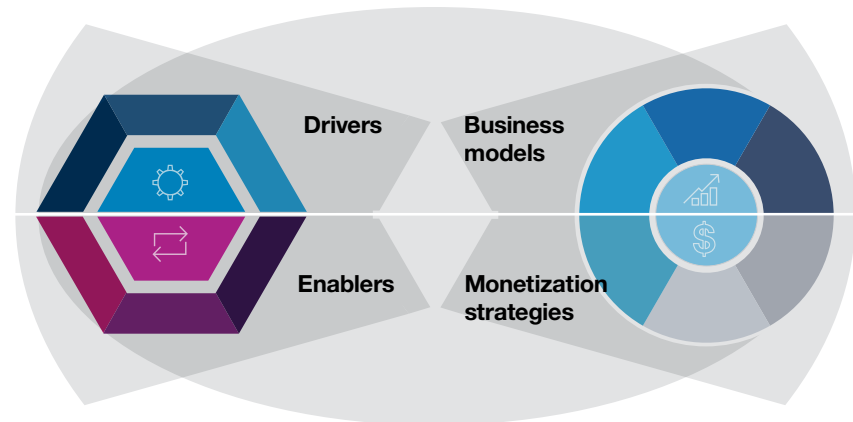
Source: IBM Institute for Business Value analysis.

API use is growing – and for good reason

Rapid growth and public availability of feature-rich APIs are significantly fueling an increase in API-centric businesses. Reasons range from ubiquitous availability of APIs, efficient development and deployment platforms, and financial models that shift away from capital-intensive needs. By some estimates, one million APIs will be in use before the end of the decade, up from about 20,000 at the end of 2015.[2] Popular public APIs from companies such as Twitter, Netflix and Google average from one-to-five billion calls per day.[3] Efficient development platforms leverage these APIs by composing API mashup solutions that feature blazing speed, enriching user experiences and simple, scalable financial models. From our research, we identified six forces driving and enabling the use of APIs (see Figure 2).

Drivers for API adoption and growth

Three primary drivers motivating companies to develop and consume APIs include:

Increased focus on creating differentiating customer experiences. Companies are employing ever-more responsive websites, custom mobile apps and other user-friendly digital interfaces to enhance their interactions with customers. API capabilities allow the creative ideas that emerge from design thinking exercises to be realized in ways that were not possible even three years ago.

Developers gain insights into customer behavior and usage patterns by leveraging cognitive APIs that analyze context and location data. These insights provide seamless, individualized experiences leading to improved "customer stickiness." Easy-to-use API development and deployment platforms with high-value, API-enabled features (such as cognitive computing) help companies engage developers, who represent a key customer set.

Figure 2
API drivers and enablers
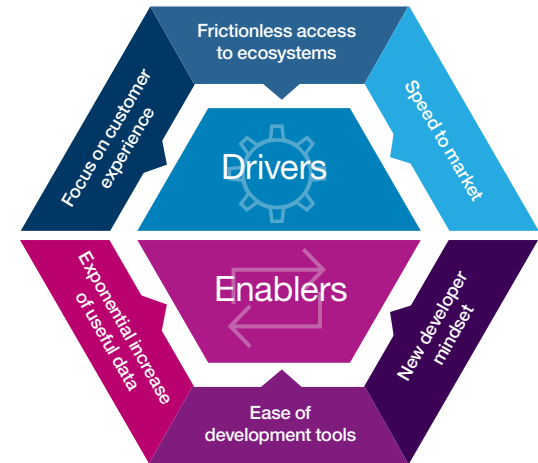
Source: IBM Institute for Business Value analysis.

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Affiliates network connects partners and generates new revenue sources

Expedia, Inc., the travel booking company, provides frictionless access to its services to ease partnership development with Expedia affiliates. The company created the Expedia Affiliate Network (EAN), opening up a feature-rich API designed to increase traffic, realize higher conversion rates and provide larger order values for its partners, including airlines and travel agencies. The API allows customers to access bookings, photos, search results and user reviews directly on third-party websites and mobile apps.[5] Expedia now generates 90 percent of its revenue through the API, driving more traffic, generating new revenue sources and creating new distribution channels for Expedia.[6] The EAN includes 10,000 partners and processes more than 70 million room nights a year.[7]

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A European car manufacturer is focused on providing these new capabilities.[4] As the automotive industry rapidly shifts toward digital services and autonomous driving, the company seeks to be a leader in the next generation of transportation. The company has put the driver experience at the forefront of its digital transformation, with an emphasis on safety, human-to-car interaction and autonomous driving. APIs provide drivers real-time access to diagnostics, location information and enhanced functionality.

By connecting the car to a mobile platform with APIs, the car manufacturer enables drivers with digital keys and car-sharing capabilities, and allows logistics companies to deliver packages directly to cars' trunks. APIs empower developers around the world to connect parking and navigation information, so drivers can locate parking spaces and pay for them with ease.

Desire for frictionless access to other companies within a larger ecosystem. APIs enable companies to leverage the data and services of other organizations beyond traditional firewalls (see sidebar). They reduce the transaction costs of obtaining, sharing and applying technology resources from external companies by providing protocols and standard usage models. This allows organizations to increase transaction volumes and revenue generation via participation in external markets; improve relationships with members and partners; as well as gain real-time views of purchasing behavior and accelerated views of new, targeted offers to buyers.

Need for faster speed to market. Organizations no longer have the luxury of reacting slowly to changing market trends. According to the most recent IBM C-suite Study, outperforming "Torchbearers" are almost twice as likely to prefer to reach the market first.[8] With the use of APIs, companies can take advantage of sophisticated technologies without having to

undertake internal efforts to develop them. The successful rise of Netflix was, in part, due to the universal access and availability across a variety of devices – from mobile phones to tablets to Smart TVs. The access the Netflix API provided to original equipment manufacturers allowed the streaming service to rapidly expand its footprint. When the API was originally opened, James Parton from the Guardian said, "Netflix reports it receives over 2 billion calls per day to its API …This kind of speed to market and scale of proliferation was impossible before APIs existed."[9]

Enablers for API development and growth

Several enablers have made it easier for organizations to leverage APIs. Based on our discussions, the three cited most often are:

Increased API availability and accessibility. Organizations have facilitated API adoption by providing: user-friendly developer sites, enhanced self-service capabilities, increased API documentation and "sandboxes" for testing APIs. In addition, third-party websites such as Programmableweb.com enable visitors to find and exploit publicly available APIs. As an executive at one financial services company noted, "When developers see how easy it is to build and deploy APIs, then developers start aggressively working with them."

Development tools and platforms with which companies can create, run and secure their APIs. Responding to the growth of APIs, solution providers have created infrastructure-as-a-service platforms that make it easier to build, host and secure APIs in scalable, production-ready environments without investing in significant IT infrastructure. Developers can focus their time and energy on creating innovative applications.

API program provides customized health management[10]

When the Affordable Care Act marketplace opened, a large healthcare provider experienced an unexpected influx of millennial patients. The decrease in average patient age exposed a gap in expectations of end-users accustomed to easy access to a wide range of services. To bridge the gap quickly and efficiently, the healthcare provider created its first API program and mobile application. This secure program facilitates collaboration between the company and application developers to improve healthcare and health-related experiences in ways that had never before been possible.

By providing developers with an easy and secure connection to the healthcare provider's public data, the API-based program shortens development time; supports accurate, effective quality apps; and expands the health-management app choices available to consumers. Patients now can download mobile apps customized to suggest nearby restaurants catering to healthy lifestyles, and food choices based on the previous week's activity and nutrition plans.

A fintech uses APIs in the search for alpha[11]

Alpha Modus Research LLC, a U.S. fintech company, sells investment technologies to asset managers and brokers looking for novel, data-driven ways to identify and bet against psychological biases in the market. Using cognitive technologies, the company is able to experiment with high volumes of unstructured data – including imbalance indications, tweets, text, video and images – in real time to find predictive patterns in market behavior quickly and efficiently.

By combining cognitive APIs with proprietary imbalance data – excesses of buy or sell orders to be executed at market close – collected from the trading floor, the company has been able to significantly improve the accuracy of stock market predictions into the close of trading. Ultimately, this has helped increase active return on investment, or "alpha." In addition to consuming APIs, the company uses APIs to deliver its services to investment customers.

A mindset shift among next-generation developers and strategists. Our research indicated a consistent mind shift, both organizationally and in the developer community. New businesses and channels are emerging globally as a result of creatively combining APIs rather than rebuilding from scratch. Nimble organizations are redefining markets through rapid innovation. These changes can be attributed to ease of access to a wider variety of services via APIs, configurable API marketplaces and agile platform-as-a-service options that provide an assembly line for innovation.

Before this mind shift, building a business and technology innovation platform via APIs, would either not be possible or would require significant capital investment and time. As one executive noted, "APIs allow us to assemble 'piece parts' of an application, hiding some apps and only surfacing others." We are seeing a similar shift among strategists, who perceive APIs as conduits to working with a host of non-traditional organizations within new and existing ecosystems.

New ways of doing business, new ways of generating revenue

API creation, consumption and subsequent repackaging within mashups – the blending of multiple services within a single application – enable disruptive innovations. APIs are driving new revenue streams, enhanced processes and cost efficiencies. The rapid rise of a number of innovative, API-centric, disruptive business models threatens established players globally.

Our research identified two significant areas of change: new business models and innovative monetization strategies (see Figure 3).

Innovative API business models

Three prominent API business models are:

Direct consumption: In this model, an organization develops and offers APIs directly to consumers. Through the APIs, consumers gain access to services that would be prohibitively expensive or time-consuming to develop in-house. These services range from commodities – such as data storage – to application development platforms, to highly advanced cognitive-computing capabilities, such as IBM Watson.

APIs also provide access to specific data sources, such as those related to social media, weather and geolocation services. This is the primary model organizations use when they are applying APIs internally.

Market making: Organizations that use this model add value to API producers' services and bring together a critical mass of consumers to create a marketplace. This business model is akin to that of a brokerage firm that generates revenue through commissions or fees for business services. APIs enable the "market maker" not only to locate API consumers and producers, but to match them in a timely fashion and execute business transactions between them, such as finding a taxi for a passenger or a room for a traveler.

Figure 3

API business models and monetization strategies
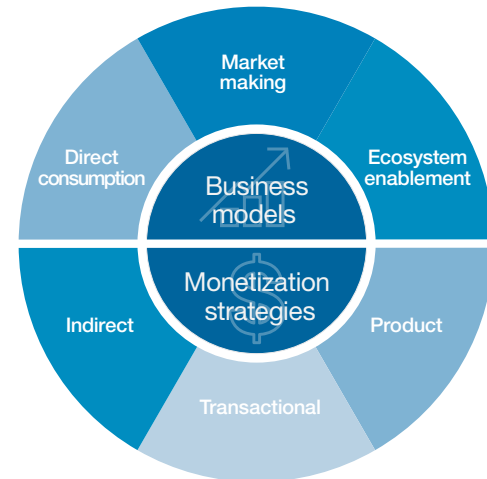
Source: IBM Institute for Business Value analysis.

While fewer in number than those applications using the direct consumption model, the applications in this model have created entirely new growth platforms that have disrupted industries – from transportation services to hospitality. For example, Airbnb provides accommodations by connecting "travelers" to "hosts," payment services and location services.[12] Beepi enables used-vehicle sales by connecting sellers to buyers across the U.S., while applying a standard approach to evaluating the condition of each vehicle.[13]

Ecosystem enablement: With this model, a company uses APIs to generate sales through partners or third parties. The company consumes APIs from multiple organizations to create a service that can then be resold by others further down the value chain. Ecosystem partners, in turn, can then repackage the service, or can enrich the offerings with suitable value-added services for sales to a different set of users.

An example of ecosystem enablement comes from RBL Bank, an innovative financial institution based in India. RBL Bank provides APIs to non-banking financial companies (NBFCs).[14] The bank enables the NBFCs to disburse loans to e-commerce sellers using its Payment API, and to recover monthly payments through the combination of its Virtual Account API and Collection Alert API.

Other companies also use these APIs across a range of ecosystems. For example, an asset management company uses the RBL Bank Payment API for instant redemption of liquid mutual funds. Companies can become "wallet" companies by combining RBL Bank's APIs with their own APIs. These wallet companies can offer retail-banking and economically disadvantaged customers access to RBL Bank's "Direct Money Transfer Service," thereby enabling affordable, secure money transfers. Independent agents who work directly with the

wallet companies help promote these applications to the economically disadvantaged customers. The wallet API funnels all the transactions to RBL Bank, allowing the company to retain the funds in-house and generate new revenue streams.

Each of these three business models comes with a unique set of strengths and challenges (see Figure 4).

Figure 4

Strengths and challenges of API-centric business models

	Direct consumption	Market making	Ecosystem enablement
Strengths	Low costs due to direct-to-consumer business model High control over API branding and SLAs	Consumer ecosystem accepts even low-use consumers to achieve a critical mass for effective operations Ability to scale by leveraging multiple producers Ability to provide global footprint by leveraging "local" partners	Access to a wide ecosystem of innovative API mashup offerings Ease of global expansion for producers of digital goods Ability to scale by leveraging multiple producers Ability to provide global footprint by leveraging "local" partners
Challenges	Restricted supply chain and sales channel Lack of incentives for ecosystem partners for promoting adoption	Business viability highly dependent on market liquidity Impact on brand due to third-party SLA dependency Low barrier to entry for competitors leveraging similar capabilities	Revenue dependency on partner sales Possible impact on brand due to third-party SLA dependency Possible impact on consumer offering due to differing versions and upgrade paths of constituent producers

Source: IBM Institute for Business Value analysis.

API monetization strategies

In addition to understanding the types of API services they need to deliver, organizations must consider how to capture revenue from these opportunities. Our study revealed three primary approaches to realizing value from API investments:

Indirect or intangible monetization: This type of monetization is a prevalent model for strategic or internal use. Google, Facebook, Twitter and other companies provide APIs free of charge to gain analytical insights or enhance market presence. In some cases, companies implement chargebacks, rate limits or quotas for API consumption. Another type of intangible monetization is the use of APIs within organizations; in most of these situations, internal API users are not charged.

Transactional monetization: Using this approach, APIs capture revenue through direct usage. API producers charge API consumers for the number of times an API is accessed, or "called." Tiers and "premium-quality-of-service" pricing allow for scalability and value enhancement. Many of the external API producers we interviewed use "Freemium" transactional models, in which they allow consumers to try out the API, then expand to a different usage level based on need. These services provide initial free tiers, then charge based on volume of usage or premium features.

Product-based monetization: APIs can also be monetized through delivery of products or bundles of services. Monetization is based on fixed fees, revenue share or value added to a business transaction. In contrast to the transactional model, the usage of the service itself is the basis of monetization, rather than the number of APIs invoked. For example, Airbnb charges for occupied inventory, duration of a stay and services availed during the stay, while Uber charges based on the vehicle type and distance travelled.

Each API monetization model presents unique strengths and challenges. Organizations need to consider the impacts to the offering, especially in the case of API mashups that may source third-party APIs with diverse monetization structures and pricing tiers (see Figure 5).

Figure 5
Strengths and challenges of API monetization strategies

	Indirect	Transactional	Products and services
Strengths	Centralized IT lowers total cost of ownership and provides superior control of corporate policies, especially privacy, security and regulatory compliance	Low entry barrier for value-add API mashups Reduced Capex and tiered Opex lowers risks to early stage usage	Monetization based on the "value" of the service provided Potential for premium charges for brand value
Challenges	Difficult to illustrate direct revenue impacts or tangible benefits Lack of tangible monetization can impact offering sustainability or growth	Opex costs at sustained high volumes may not be price effective Transactional volume may not reflect true value of API usage	Cost variances and pricing instability due to mashups leveraging third-party APIs

Source: IBM Institute for Business Value analysis.

Recommendations: Taking the first step

While the API economy allows organizations to reimagine their business processes, create unique customer experiences and develop new products and services, many are still starting their API journeys. As companies consider their roles in the API economy, they need to:

Identify potential sources of API value

- Locate areas in the value chain where more seamless connectivity adds value to the organization.
- Determine which combinations of functionality or data sources are of value when exposed to internal or external parties.
- Identify internal and external partners whose unique capabilities should be combined to deliver new market propositions.

Develop the business case

- Clearly spell out your company's business goals that will drive API creation or consumption.
- Examine business models and monetization strategies that address the needs of your target audiences and internal funding requirements.
- Evaluate your existing IT infrastructure to understand the technical requirements associated with API development and ongoing support.

Start small, but design for scalability

- Consider the development of internal APIs as initial proofs of concept.
- Set realistic targets for your API adoption strategy; recognize that while many public APIs have been successful, some have not.
- Identify qualified consumers with whom APIs can be tested and quickly ramped up if successful.

Are you ready for the API economy?

Key questions to address:

- How is API adoption integrated into your organization's digital strategy?
- In what ways are internal or external APIs used by your organization today?
- How do you identify existing capabilities in the marketplace that your organization could access through APIs?
- What unique digital assets does your organization possess that could be more effectively exploited through the use of APIs?
- Which people in your organization have responsibility for identifying potential APIs that could add value to your existing products and services?

How we conducted our research

Our research included interviews with more than 30 individuals with API experience across a variety of industries – from financial services to retail. Some represented companies that produced APIs for use by other organizations, others focused on consuming APIs in their internal- and external-facing processes, while still others used APIs to build entirely new products and services. We also spoke with industry analysts and members of academia who have watched the API economy evolve over the last several years from a series of technical standards into an arsenal of disruptive innovations.

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For more information

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