




Digital Rails

**How Providers Can Unlock
Innovation in DFS Ecosystems
Through Open APIs**

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This document explains the concept of “Open APIs” in digital finance services (DFS), how they enable increased innovation, and the role they can play in expanding DFS ecosystems.

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1. State of DFS today

This section outlines the state of the DFS industry today, including the key reasons for the limited range of new solutions emerging that leverage the DFS “rails”.



The DFS industry continues to evolve steadily. However, high rates of inactivity and only a few use cases continue to dominate.

TODAY, THERE ARE . . .



DESPITE THIS IMPRESSIVE PROGRESS

- Only **33%** of these registered accounts are actively used (at least once in 90 days).
- While active customers transact around 11 times per month on average, **66%** of transactions are airtime top-ups.*
- Person-to-person transfers make up almost **72%** of the total value of transactions.*

Source: GSMA, "2015 State of the Industry Report, Mobile Money"

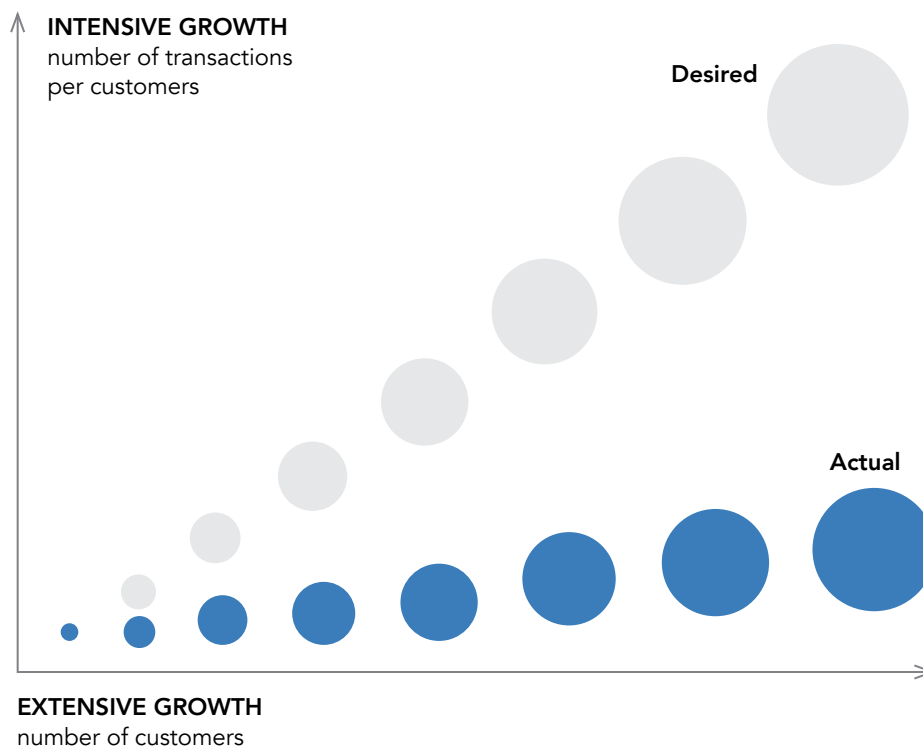
* December 2015

Industry growth is primarily characterized by more customers rather than more transactions per customer.

These figures make clear that the DFS industry is facing a critical challenge—growth to date has been primarily extensive (number of customers increases) rather than intensive (number of transactions per customer goes up).

Extensive growth is problematic because markets eventually reach a saturation point. As a result, customers don't realize the potential benefits of financial inclusion, and the revenue potential for providers is curtailed.

Multiple innovative solutions targeting niche segments are required to entice customers to transact more. If things remain as they are, low-income customers will likely continue to favor informal solutions to address the majority of their financial challenges.



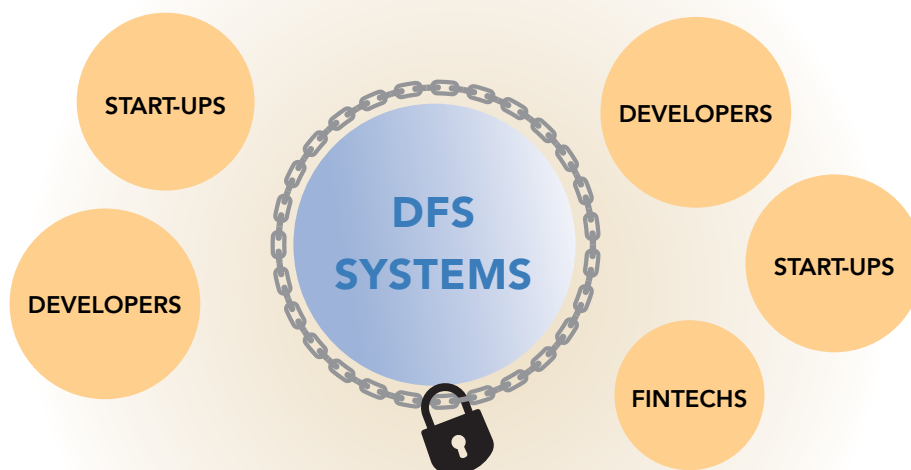
Digital payments providers are limited in their ability to deliver multiple new and meaningful solutions for several reasons:

- ➔ **Digital payments providers typically rely on their core platform vendors for elements of the product development process.** This increases the cost and time to innovate, and limits their ability to innovate in multiple directions at the same time.
- ➔ **Digital payments providers need to invest significant resources in core operations (the platform, agent network, marketing, etc.) and often have only limited resources dedicated to innovation.** These resources are focused on solutions that appeal to the majority of customers. More targeted, niche solutions are not the focus of internal innovation.
- ➔ **Mobile network operators (MNOs) and other non-bank providers are not licensed to directly offer solutions that incorporate credit, savings, or insurance elements.** This means, in the absence of partnerships, innovative solutions produced by these providers have little potential to advance inclusion beyond payments innovation.
- ➔ **Recent gains in digital financial inclusion have mostly been driven by non-banks. Even when banks create or have access to large-scale digital payments platforms, low-income customers are often not a priority.** Banks have the capacity to produce a broader range of financial solutions beyond payments; however, they are often risk averse and weighed down by compliance costs. Further, in many developing countries, banks have alternative sources of growth, either through expanding in the middle-income segment of the market or funding the public sector through government bonds.

Smaller third parties who could contribute to the innovation effort are effectively excluded from the DFS ecosystem.

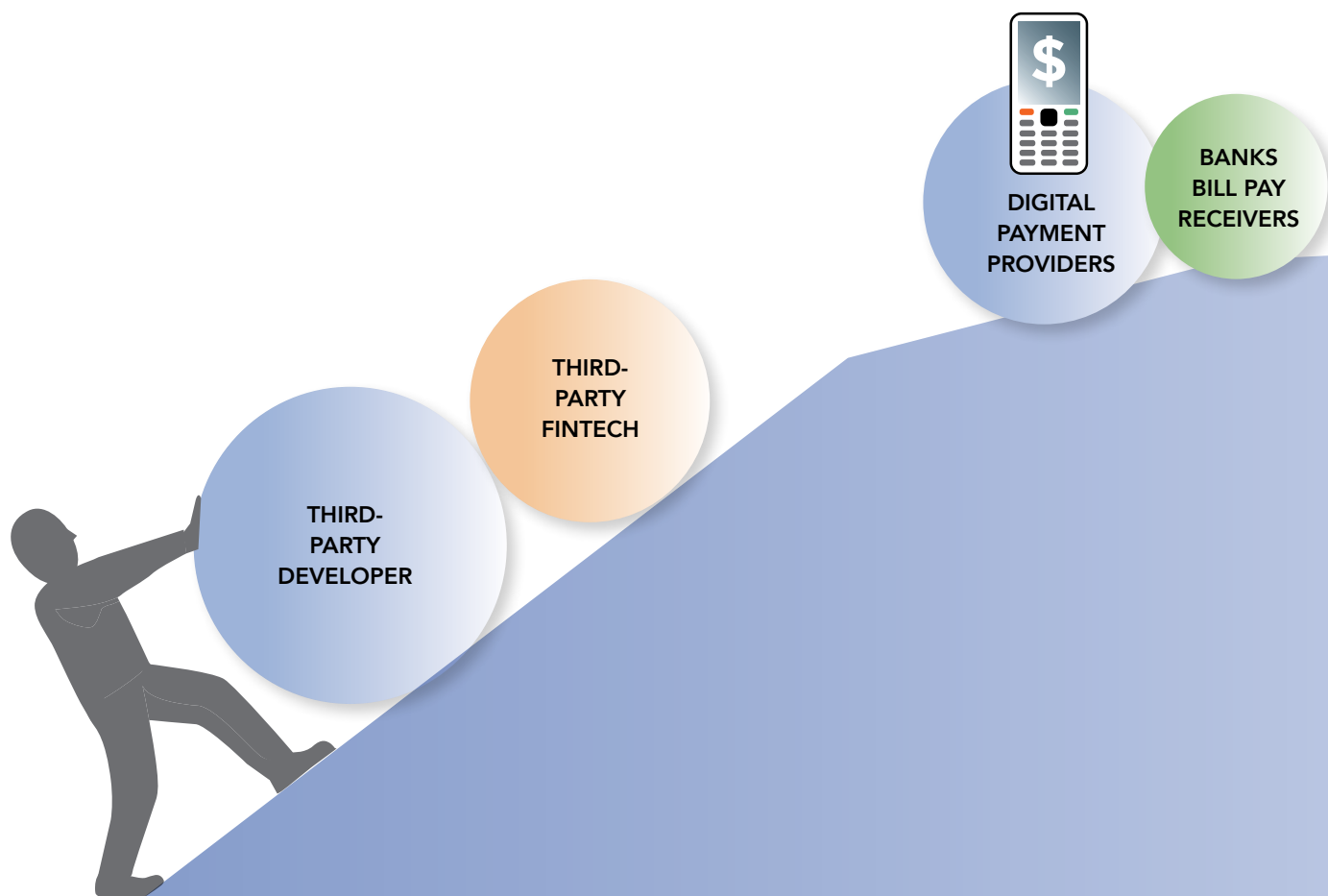
Third parties (e.g., FinTechs, start-ups, developers, digital banks) could bring disruptive solutions to market through a more agile development cycle, better knowledge of niche market segments, new technology, lower costs, and leveraging of synergies with their own core business. However, they do not have direct access to the “digital rails” of large-scale payments providers. For example, this includes the ability to make and receive payments, leverage agent networks, or access customer data (with consent).

Recent CGAP research in Kenya showed that smaller third parties (e.g., developers and start-ups) are often deprioritized from access and are most likely to have high costs, long delays, and lack of transparency when trying to connect to digital payments providers. Neither the process nor commercials are typically standardized.



There are success cases involving third parties, but these are exceptions.

Innovative solutions requiring deeper integration with third parties have come to life in certain markets (e.g., M-Kopa and M-Shwari), but digital payments providers often prioritize access to larger third parties (e.g., banks and large bill pay receivers), companies with prospective large volumes of transactions and revenues for providers, and third parties that have existing relationships with digital payments providers.



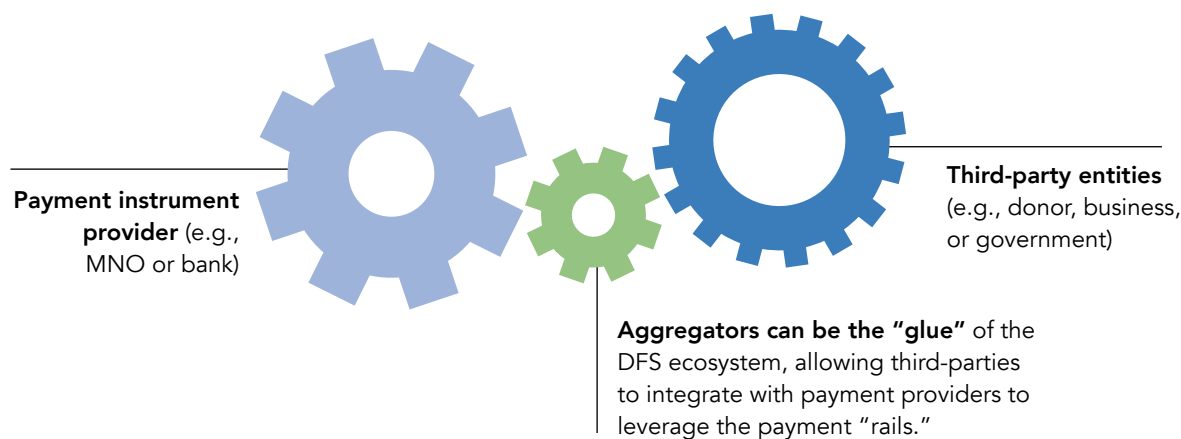
Aggregators have developed in most markets to facilitate payments integration, but they add costs to the business model.

Several MNOs that offer mobile money, especially in East Africa, have formed exclusivity agreements with aggregators to handle integration and solutions development efforts. These partnerships have enabled the roll out of several solutions, including bill and bulk pay, retail payments, and payments across networks. They have connected sometimes hundreds of third parties to the payments service. Aggregators are particularly useful for third parties that limited technological capabilities.

However, aggregators have one fundamental disadvantage: **they introduce additional fees that make the end-to-end transaction expensive for smaller third-party developers.**

Aggregators raise the per transaction cost paid by third parties integrating into the payments platform because revenue needs to be split between the aggregator and the digital payments provider. Thus, even with aggregators, many third-party developers continue to be excluded from the DFS ecosystem.

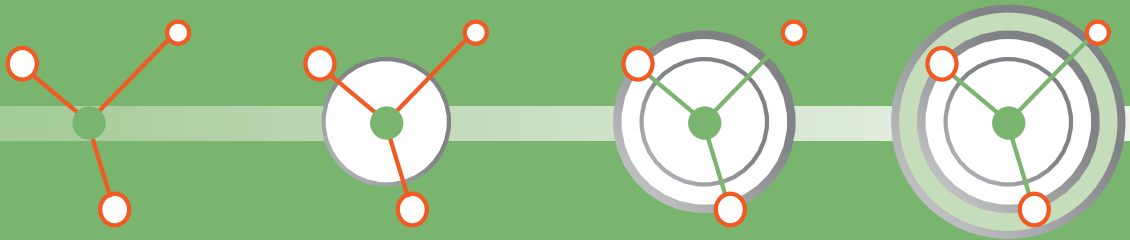
Open APIs (application programming interfaces) could enable third parties to leverage the digital “rails” of payment providers to unlock innovation.



Source: CGAP

2. How APIs catalyze innovation

This section defines APIs in the context of DFS, and elaborates on the role that more open APIs can play in catalyzing the expansion of the DFS ecosystem.



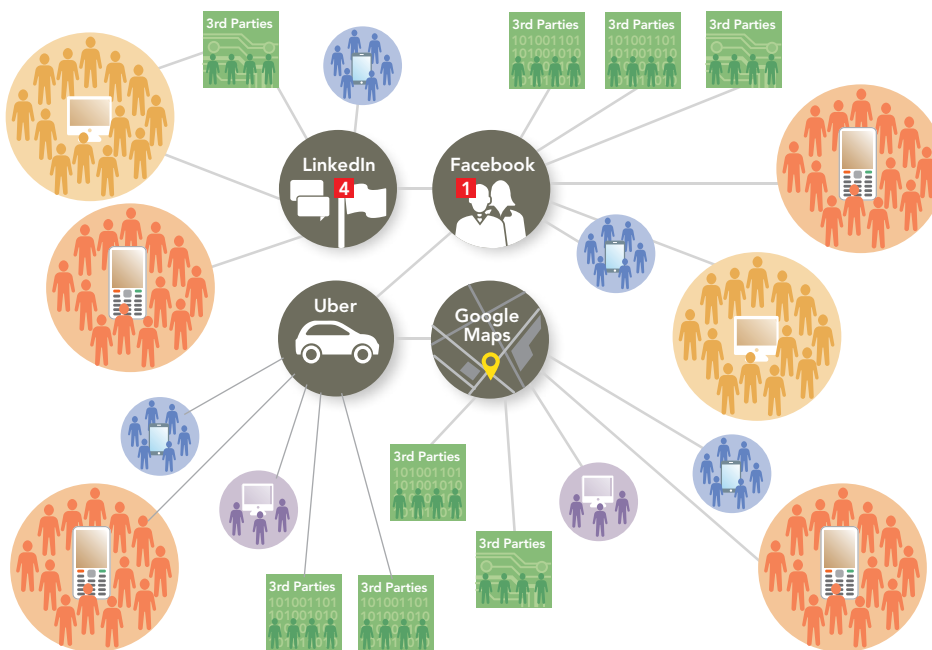
What is an API?

An **Application Programming Interface (API)** “is an architecture that makes it easy for one application to 'consume' capabilities or data from another application” (Apigee). It is a contract that allows software programs to “talk” to one another, defining what information should be supplied and what actions will be taken when it is executed.

APIs can fall along a spectrum from internal APIs that are reserved for use by developers working within, or on behalf of, the organization only, to partner APIs that are made available to select partners only, to open APIs that are more broadly available.

Open APIs are not new. As early as the year 2000 leaders in this field, such as Salesforce and eBay, were exploring more open APIs. eBay initially opened APIs to select partners and developers to “standardize how applications integrated with eBay, and **make it easier for partners and developers to build a business around the eBay ecosystem**” (API Evangelist).

Today, businesses increasingly rely on partner and open APIs from other businesses to design innovative products and services that might not otherwise be possible. These businesses are often providers and consumers of APIs.





Source: Apigee; API Evangelist

Most of us use APIs every day.

Without APIs, posting to Facebook would not be as seamless . . .



. . . and Uber would need to develop its own mapping and payments capabilities.

Action	 Driver queries shortest route for customer	 Customer pays for the trip
API Accessed	Mapping Services	Payments integration service
API Owner	Google Maps/ Waze	Braintree

In DFS, third parties that can seamlessly connect to established payments platforms can drive multiple services that collectively address the needs of many customers.

Within the DFS ecosystem, a range of third parties can play an active role in identifying unmet needs of customers and creating powerful niche solutions to meet those needs.

These solutions rely on APIs from digital payments providers. However, innovative third-parties can also weave together a range of APIs from different players to enhance the functionality and attractiveness of solutions—financial and beyond.

Payments providers can continue to innovate internally, developing and delivering solutions directly to customers, including by consuming APIs of others. **At the same time, they “productize” their APIs, competing on the type of assets they make available to third parties (new APIs) and how easily accessible those assets are (how open).** Innovation is driven internally, through strategic partners and through third parties leveraging open APIs.

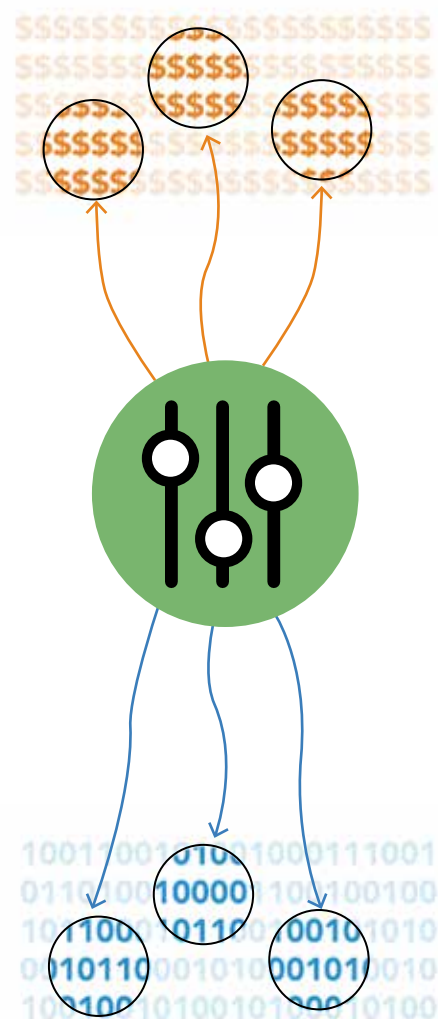


DFS APIs fall into three main categories: Consent, payment, and data.

Consent APIs are the foundational layer of APIs that enable third parties to call both data or payment APIs for consenting account holders. These APIs authenticate the account holder and consent (authorize) the third party to gain access to certain assets for that account holder. It is through consent APIs that customers give third parties permission to access their data or to move their money. Consent APIs enable customers to include parameters on permission (to do/access what, for how long, how many times, etc.).

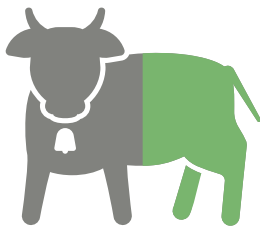
Payment APIs facilitate the transfer of digital value from one place to another. These APIs enable a variety of use cases from bill payments to bulk payments, merchant payments, and online payments. These are the most frequently released APIs within DFS.

Data access APIs enable third parties to access data on customers, agents, and even merchants to build out their solutions. Types of data released by digital payments providers can include customer transactions, liquidity levels of agents, and geolocation data for account holders. Some data APIs will be aggregated data; some will be anonymized data.



Third parties can create some powerful solutions when consuming these APIs.

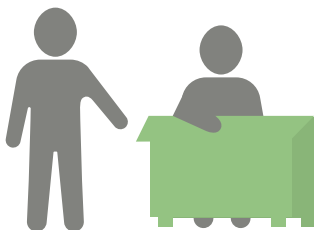
Imagine a solution that could . . .



Help customers to save by auto-deducting a small amount from their wallets and transferring that value to a separate savings wallet or bank account. Customers could have a visual representation of how much they saved to date (e.g., half of a cow, one-tenth of a house). **Solution powered by: data, payment, and consent APIs.**



Help retail agents manage their cash float, by leveraging an Uber-like cash-in and cash-out facilitation platform. Customers could make surplus money “work” by responding to agent cash deficits for a fee. **Solution powered by: data, payment, and consent APIs, as well as location APIs.**



Let merchant aggregators enable their merchants to offer their customers loans for in-store purchases. **Solution powered by: data, payment, and consent APIs (complemented by non-DFS APIs, for example, to enable repayment reminders).**

These powerful solutions can extend well beyond finance.

FINANCE

Real-time credit score (incorporates data from all my financial services)

EDUCATION

School savings scheme and loan top-up (credit); monitor performance and attendance

BASIC SERVICES

Manage monthly water usage and payment; prepurchase solar credits and manage daily/weekly plans

BUSINESS AND TRADE

Manage stock or other inputs; manage goal-savings plan for personal and business—help buy a house, bike, or cow

SOCIAL COMMITMENTS

Asking for and making social contributions; lending to and borrowing from social network



Multiple types of developers are well-positioned to consume DFS APIs and offer innovative solutions for the poor.

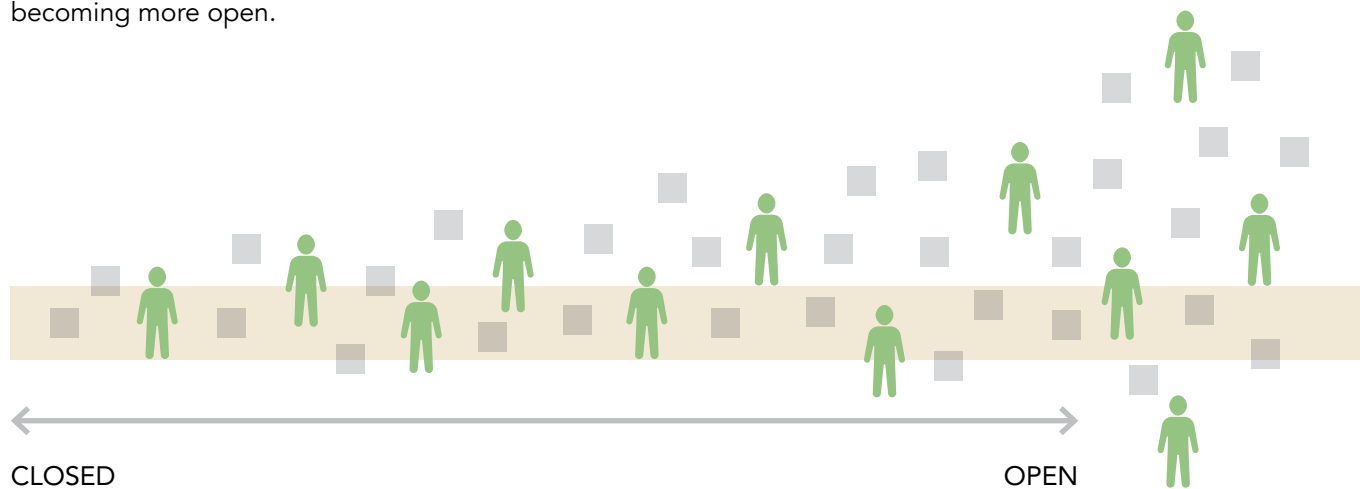
Type of Developer	Example
Aggregators, master/super agents, payment gateways (supportive ecosystem players)	Kopo Kopo, wanting to make a better merchant experience to recruit more merchants
Banks and other financial institutions	KCB and CBA offer loans and savings accounts leveraging Safaricom data and payment capabilities
Businesses and start-ups with complementary technical capabilities	M-KOPA selling pay-as-you-go solar electricity
Independent developers, FinTech disruptors, app developers	M-LEDGER spotting a missing user-experience opportunity and creating an android app that was later acquired by Safaricom
International businesses	Uber wanting to enable a frictionless experience for mobile money account holders, as it has for card customers
In-house innovation	Customer care wanting to help customers with the SIM swap process (by informing the customer of progress through SMS updates)

All APIs are not equal: Businesses exposing APIs can choose which APIs to expose, to whom, and under what terms.

One of the challenges to open APIs is that providers are often concerned about risks open APIs may expose them to and do not know how to mitigate these risks.

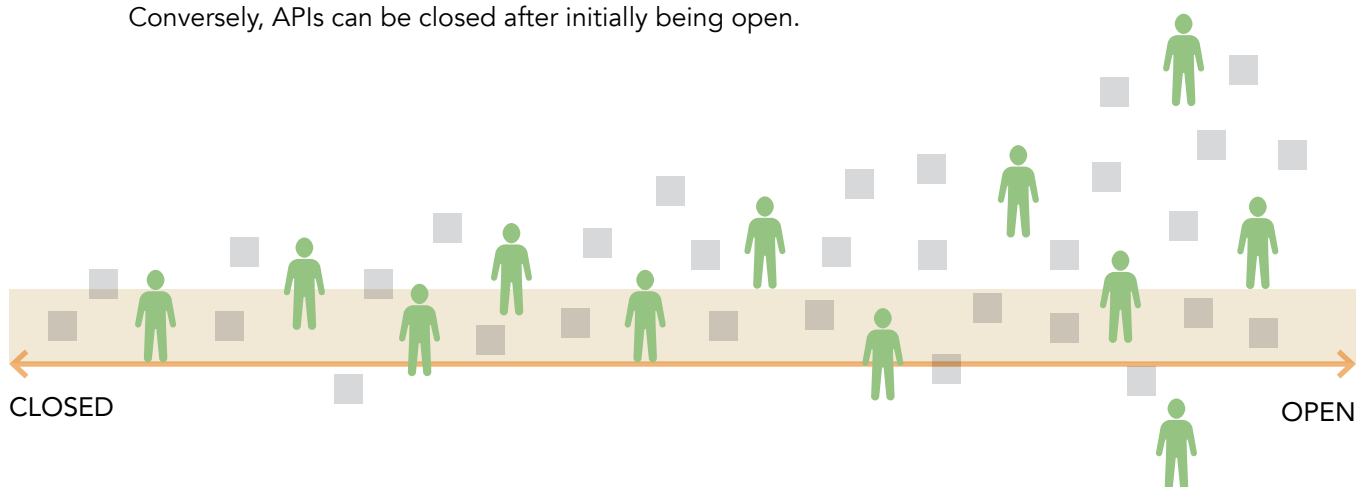
An API provisioning platform helps a business to selectively launch APIs—some APIs could be reserved for strategic partners only, while others could be opened more widely. All are provided through the same mechanism.

Better understanding their API options and the functionality that leading API platforms offer can help businesses mitigate risks and capture the benefits of becoming more open.



The strategy toward API openness can evolve over time.

APIs can start focused on internal clients and become open over time. Conversely, APIs can be closed after initially being open.



INTERNAL

Benefit: Agility

Selected organizational assets are open to use by developers working within, or on behalf of, the organization. This can improve time-to-market for certain internal innovations.

PARTNER

Benefit: Collaboration

Selected organizational assets are open to use by a chosen set of partners only. As new APIs are designed, the digital payments provider can decide the right developer segment that should be eligible for access. For example, any APIs that require a user PIN as a parameter would have to go through an extensive verification processes.

OPEN

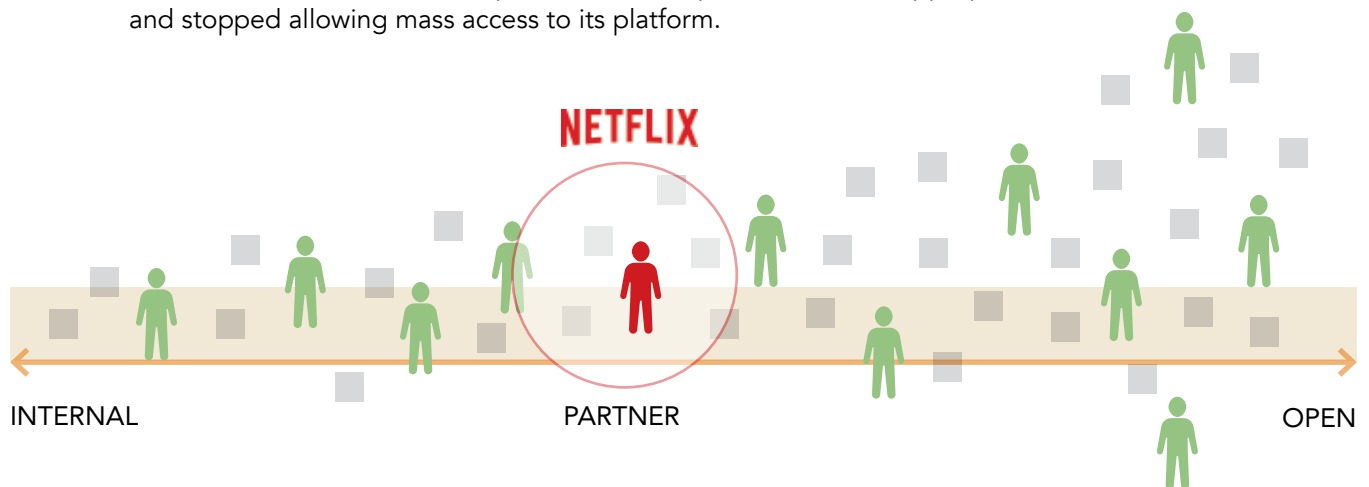
Benefit: Innovation

Selected organizational assets are open to use by outside developers who register for access. To reach the long tail of developers, these open APIs need to offer self-service access. It is critical to proactively “watch and learn” from the API traffic, to understand usage, manage risk, and design appropriate controls, as well as to support decisions on API roadmaps.

Source: APIgee

APIs don't have to remain in any particular category: Netflix managed to generate impressive revenue by focusing on its internal and partner APIs after reviewing its API traffic.

Netflix started with an open API strategy, but a few years after launch, it found that the majority of its traffic was coming from a small set of partners and from internal API usage. So the company decided to prioritize energy appropriately and stopped allowing mass access to its platform.



Netflix is available on over 1,000 different device types today because its well-developed internal API offers a standardized interface that allows engineering teams at Netflix to work on onboarding new devices in parallel. Its internal API receives over 5 billion calls a day, 97.7% of total traffic.

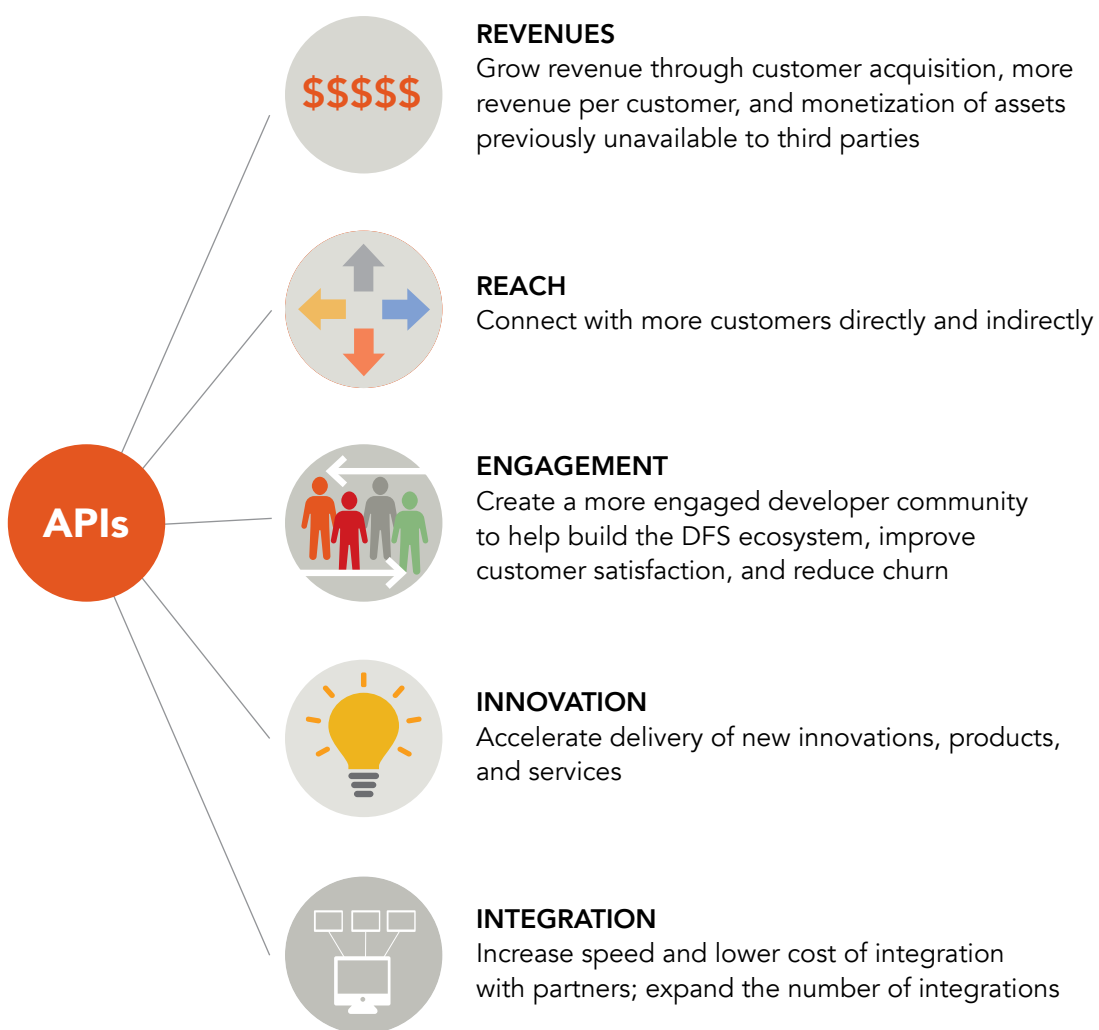
3. Transitioning toward Open APIs

This section explores some of the reasons why a digital payments provider would transition toward openness, notes some of their concerns with opening up, and considers some of the workarounds third parties pursue in the absence of openness.



Businesses might open APIs for a number of reasons.

Broadly speaking, any digital payments provider that is launching an API program will be aiming to achieve one or more of the following business goals:



Source: <http://www.apiacademy.co/>

In DFS, open APIs can drive the ecosystem expansion—more solutions, more usage, more revenue.

APIs turn digital payments providers into “rails” for a broad range of applications.

- Payments providers’ resources are no longer a binding constraint to innovation. Third parties invest in parallel, leveraging their different assets and skills to develop solutions that complement those of payments providers.
- APIs facilitate both internal and external solutions development. Payments providers continue to innovate in parallel, and remain in control of which assets are made available and to whom.
- The rate of development can be higher. Numerous innovations can be developed in parallel. Innovations can create new customer-facing solutions, better customer experience for existing solutions, and enhanced reach via ecosystem players, for example, through improved agent/merchant experiences.

APIs can lead to important revenue streams plus strategic positioning at the center of the ecosystem for digital payments providers.

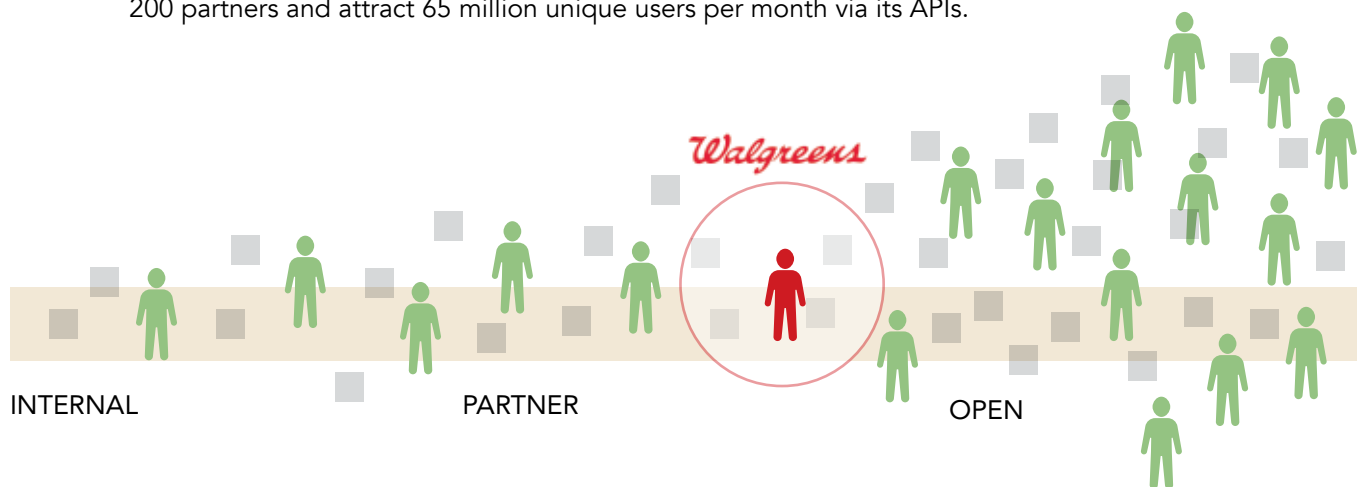
- A range of third-party solutions, addressing an array of consumer pain points, can increase the number of customers and the number of transactions per customer. The combination can quickly build transactional volume.
- A new type of customer is added—third parties that consume DFS APIs. This generates direct and indirect revenue opportunities.

Systems integration time is cut significantly with well-designed APIs.

- This increases the possible number of partner integrations that providers can complete annually, leading to significant cost efficiencies per integration and increased payment and data revenues.

The Walgreens experience demonstrates how opening strategic APIs can boost revenues from existing products and services.

Walgreens made the strategic decision to open its photo printing and pharmacy solutions to the outside world via APIs. A large number of developers responded and created immensely popular applications such as Printicular, which allows users to print photos directly from Facebook, Instagram, or Dropbox. Walgreens managed to enroll 200 partners and attract 65 million unique users per month via its APIs.



Walgreens was able to enhance overall customer engagement with its retail stores: Those customers who interacted with Walgreens both via web/mobile devices and in-store were generating six times more revenue than those who just shopped at the stores.

However, some digital payments providers have expressed concerns in progressing toward openness.

Cannibalization of revenue: Some providers are concerned that opening up their platforms could lead to cannibalization of their products (existing and those in the pipeline).



Digital payments providers need to holistically evaluate the potential impact of enabling external innovation. In certain cases, some cannibalization can be offset by substantial increments in the number of customers and transactions per customer, or through other levers.

Reputational risk: Digital payments providers are still uncertain whether developers have the capacity to deliver products that will scale and not operate to the detriment of the payments provider's brand and consumer trust.



Payments providers will need to manage the way third parties present their solutions and use the payments provider's brand.

Consumer protection/fraud risk: Providers are concerned about the risk of more open API structures, specifically as they relate to accessing and sharing confidential customer information. They also want to better assess and determine how to mitigate the risk of fraud, specifically by those accessing the payments platform in new ways.



This is where well-managed customer consent APIs become critical—putting customers in control of their money and their data.

Internal conflicts: Champions within digital payments providers trying to pitch open API structures to decision makers face a fundamental challenge—the requirement for immediate and high returns for any new business case makes investment required for open APIs a hard sell. Because of the lack of clarity on the business case, few providers have a clear strategy for open APIs at a group level or dedicated local leadership to implement the strategy.



Successful DFS open API demonstration cases should gradually address this reluctance.

Remaining closed is an option, but increasingly, third parties are able to find suboptimal workarounds to access valuable assets; the proliferation of smartphones will make this easier.

Examples of workarounds, also known as “Generation 1” APIs:

- Shared pay bill accounts, with funds ownership managed by aggregators.
- Automated login and activities to work around onerous processes.

Smart phones’ operating system flexibility can work against digital payments provider intentions:

- Robots can be designed to automate arduous tasks.
- SMSs can be “scraped” to reconstruct a data feed.



The workarounds simply mean there is a problem that is not currently being solved well.



Innovation happens outside the digital payments provider domain to solve that need.

THE CONSEQUENCES OF WORKAROUNDS

TECHNICAL PROBLEMS

- Robots plus scale equal a very poorly performing system for the rest of the network.

DATA LOSS

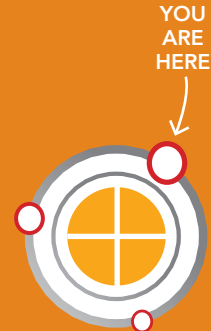
- Loss of data to aggregators could harm future innovations for the digital payments provider.
- Potential AML/CFT issues arise from account-sharing models.

OVER-THE-TOP (OTT) PLAYERS GAIN MARKET SHARE

- Innovation can occur “around” digital payments providers.
- OTT players like Branch (branch.co) and Tala (tala.co) in Kenya can leverage smartphone capabilities to deliver OTT solutions.

4. Implementing Open APIs

This last section highlights some of the core elements of an open API effort that digital payments providers would need to consider when transitioning toward openness.



Payments providers transitioning toward openness will need a mindset shift from developing end solutions only for users, to also treating third-parties as customers, who in turn deliver innovative end solutions.

Many businesses might start experimenting by opening a core set of assets to developers via APIs, either in response to latent demand for these assets or to gauge whether there is enough interest in consuming them.

Eventually, APIs will need to be not just exposed ad hoc but strategically “productized,” monetized, and operationalized.

“APIs cannot just be turned on. You need a clear strategy for their growth. You need to test them, and you need to carefully feed them and try different approaches to make them bloom and flourish.”

—John Musser, API expert

The East Africa experience highlights some of the challenges third parties experience when trying to access and consume APIs.



Developers are offered a very limited set of payment APIs.

There is a latent demand for “beyond payment” APIs to facilitate a broader array of solutions. For example, some developers express the need for authentication APIs to facilitate in-app payments, while others want to consume data APIs and leverage consumer, agent, and geolocation data for purposes of innovation.



The commercial model for accessing core APIs is not transparent to third parties. In some cases, this results in price discrimination based on opaque criteria, such as who a third-party developer knows within the payments provider.



There is a lack of easy-to-read and easy-to-navigate API documentation, helper libraries, and online communities for developers to support each other in the integration process.

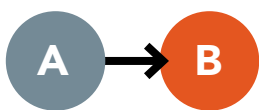


Providers typically do not offer a sandbox test environment to allow developers to experiment with the API before launching the solution. This limits the ability of providers to test and effectively tweak solutions before launch and increases error rates of those solutions.

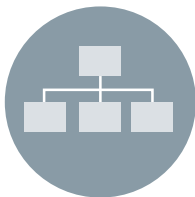


APIs often leverage legacy technologies for API definition and security protocols. While relatively common within the financial services industry, these technologies are considered “heavy” and “outdated” when compared to simplified modern protocols. Developers often find workarounds to this pain point that may potentially lead to other problems.

To address these and other challenges, the following core elements must be developed as part of an effort to launch open APIs.



A clear strategy for open API implementation that has buy-in from senior management and is aligned to the business strategy. It should make clear the business rationale for opening priority APIs.



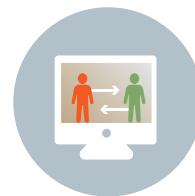
A business structure that supports implementation, provides ongoing support to external developers, and manages the API, including critical roles such as API product management and a community engagement manager to ensure that developers can easily link into and derive value from the platform. The business structure also needs to address the legal and commercial requirements of more open APIs.



A sandbox test environment where developers can test APIs and observe the results quickly before they hit a live environment.



A well-designed developers portal that provides a one-stop shop for API onboarding, documentation, exploration, collaboration, discussion, support, and more. A good portal is important to attract and retain a critical mass of developers. The portal should detail available APIs and clearly explain to outsiders what to expect so that they can develop and deliver solutions easily. Ideally, the developers portal should enable developer self-service.

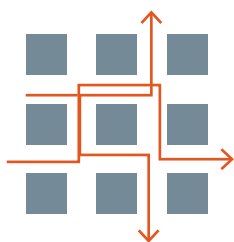


An online collaborative space to inspire developers, communicate roadmap thinking, and receive feedback. Initially, this needs to be “manned”; however, the vision would be that the community can support each other’s queries over time.

continued

To address these and other challenges . . .

(continued)



A self-service mindset, including developer onboarding, and transparent and standardized commercials and contracts. This should include clear service-level agreements around response and resolution times.



A developer community engagement strategy that includes social ways to educate and incentivize active developer consumption of APIs. Hackathons are one option to engage developers and get them more familiar with available APIs. Developer challenges can be explored to incentivize more polished solutions. Developers may also benefit from mentorship or marketing support. Digital payments providers should also listen to, and incorporate, developer input and feedback.



An ability to learn from best practice and leverage existing initiatives. Most notably, GSMA is developing harmonized API definitions for commodity payment APIs, such as bulk payments, bill payments, and bank-wallet transfers, among others. Digital payments providers should look to leverage these where appropriate. Further, payments providers should leverage best practice from other sectors for authentication and authorization security, with the “long tail” and cost in mind.



A roadmap that looks beyond commodity APIs and pushes the API boundaries. Third-party innovation will benefit from access to a broader set of DFS assets and capabilities, moving beyond basic payments, and including data and location, for example. The roadmap should ideally draw from developer input.

Source: GSMA Mobile Money APIs available at <https://mmapi.gsma.com/>

Final thoughts

The transition toward open APIs has potential to lower costs, increase efficiency, and most importantly from an ecosystem perspective, expand the breadth of innovative solutions to which DFS customers have access. CGAP posits that this transition toward openness, and the ability of third parties to leverage digital payments providers' (and other) assets, is a critical step in growing the DFS ecosystem, and with it key metrics, such as number of active customers, number of transactions per customer, and overall industry revenue.

Two things are needed for this shift to be realized:

- 1. Exposure of a greater range of APIs.** APIs should facilitate more than just payment solutions; allowing third parties to effectively access a range of business assets to create solutions—financial and other—that add real value to the lives of customers.
- 2. More openness.** This includes the creation of infrastructure and a self-service environment that allow a broader range of third parties to consume valuable business assets safely and effectively.

The key to this is a mindset shift, with the digital payments providers moving from end-to-end customer ownership to owner/provider of modern “rails” to facilitate industry innovation in a way where governance is maintained and risk management and consumers are protected.



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