



Let's talk about how we talk about interoperability

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Insights

- We typically talk about interoperability in terms of technical interoperability, network interoperability, and regulatory interoperability. In these discussions, evolving technology, standards, payment system modernization, regulatory harmonization, and trade agreements loom large.
- Because regulatory interoperability, done well, enables the other two types, it is perhaps the most important to make progress on.
- Discussions of interoperability can sometimes turn into recommendations for uniformity and rigidity, and we believe this can stifle innovation.
- Reaching common goals and metrics for technical, network, and regulatory interoperability is an essential next step toward the ultimate goal of a more equitable and inclusive payment system.

From business strategy to buzzword and back again

Coding competitions known as “tech sprints” (formerly known as “hackathons”) emerged on the periphery of technology conferences in the late 1990s, gained popularity in the mid-2000s, and are now nearly compulsory at every major fintech festival and payments conference.¹ Before it became a buzzword, a tech sprint was just part of the job description for business software engineers. One of the great tech sprints in the history of payments occurred in the mid-1970s when a Visa engineer named Frank Fojtik wrote the code that eliminated a major pain point for cross-border retail payments interoperability.

Although most consumers today take for granted the speed and efficiency of cross-border consumer payments, until the 1970s, international transactions were slow and cumbersome. If a US cardholder made a purchase in the UK, the British acquirer (merchant's bank) would need to send a telex to the card issuer requesting an authorization. Manual processes, time zone differences, and slow

¹ Notable examples include the Monetary Authority of Singapore's Global FinTech Hackcelerator (<https://www.fintechfestival.sg/media-releases/mas-announces-20-finalists-for-the-2020-global-fintech-hackcelerator>) and the UK Financial Conduct Authority's popular series of tech sprints on topics as varied as women's empowerment, mental health, RegTech, and AML compliance (<https://www.fca.org.uk/firms/innovation/regtech/techsprints>).

telecommunications infrastructure added additional friction to the process. Author David Stearns tells the story in his book, *Electronic Value Exchange*:

The ultimate goal was to expand the online computer network internationally, but in the 1970s this was not entirely practical, so Fojtik developed a rather ingenious stopgap. Building on a similar system he had done for Singer, Fojtik wrote some software that emulated a telex and provided a bridge to BASE I.² When a foreign bank needed an authorization on a US card, they telexed a new number in San Mateo, which corresponded to a modem connected to one of the old PDP-11s.³ Fojtik's software then read the request, parsed it, reformatted it into a BASE I authorization request message, and submitted it to the switch. A few seconds later, his program received the response, which it then reformatted into a telex reply message. Because the operating regulations stipulated the proper ordering of the telexed information, it was rather easy to write the parsing software, and Fojtik remarked that it was actually quite forgiving. Because card numbers, expiration dates, and amounts were all distinctly recognizable, the software allowed them to be in almost any order with any amount of whitespace in between. Using this system, foreign acquirers could now obtain international authorizations within a few seconds, at any time (Stearns, 2011).

Because of this interoperability “hack,” nearly instant cross-border retail payment authorizations existed before anyone had personal computers and smartphones—or even a Sony Walkman.

Why interoperability matters today for small businesses

Throughout the global pandemic, millions of small businesses around the world have been struggling to keep their firms open and profitable, and people have needed to use digital means of payment more than ever. One critical way global policymakers can help small business owners now is by working to digitally enable more people and merchants. Greater interoperability in payments is a key component of this goal. The world needs better ways to connect customers, merchants, employees, financial institutions, and e-commerce platforms. Through interoperability, we can create a more open payments system and, in doing so, give more people access to the formal financial system. When payment interoperability works, it is nearly invisible: Consumers and merchants easily connect with each other, regardless of their preferred method of paying or being paid. When barriers to interoperability are minimal, the payment system is more resilient, secure, open, efficient, and inclusive. We notice when interoperability fails, and we notice where it has never meaningfully existed.

Why interoperability matters for consumers

Increasingly, new payment innovations are bringing unbanked consumers into the formal financial system. New technologies, most notably mobile phone payment applications, have enabled many consumers without bank accounts to send and receive money digitally. Alternative payment services such as these also serve as a gateway to much needed formal financial services for the unbanked (e.g., credit, insurance, and investment management).

Many of these new technologies bring with them new benefits, but they do not guarantee ubiquity. Often, closed-loop networks can make it difficult to connect with out-of-network accounts, financial institutions, and accounts in other countries. This can significantly hinder financial inclusion efforts, because inefficiencies in moving money among accounts may discourage consumer participation. Additionally, the inability to connect to the broader financial system can be a big enough barrier to discourage new payment service providers from entering the market, reducing overall competition and preventing new services aimed at underserved populations from being brought to market (CPMI & World Bank Group, 2016). For instance, new service providers may have difficulty attracting customers if they can connect them only within their own fledgling network.

² BankAmericard Authorization System Experimental (BASE), the electronic authorization system put into production in April of 1973.

³ The PDP-11 was a series of 16-bit minicomputers produced by Digital Equipment Corporation starting in 1970.

What we talk about when we talk about interoperability⁴

Like “tech sprint” and “hackathon,” the term interoperability has become a buzzword rather than a business strategy. It is time to get on the same page when discussing interoperability.

Although there are varying interpretations of interoperability, the commonly accepted objective is this: Payment systems and frameworks work together to facilitate information exchange with minimal manual intervention, especially information required for processing transactions. Interoperability seeks to address a basic need shared by consumers and businesses: the need to make and receive payments easily and efficiently.

According to the Alliance for Financial Inclusion (AFI)⁵, interoperability allows for the “seamless flow of payments from and through multiple accounts held by consumers arising from transactions from different service providers, enhances user experience, promotes product development to meet user needs, increase convenience, relatively reduces costs and several other benefits” (AFI, 2017). At its best, interoperability may feel “seamless,” but the process for achieving it requires coordination and agreement across a broad range of stakeholders and, therefore, can be quite complex. Further, because payment technologies and services are constantly evolving, achieving interoperability is a continual journey.

Here are some necessary ways we talk about interoperability today



Technical interoperability

The ability to facilitate payment transactions between different applications and infrastructure to enable straight-through processing



Network interoperability

The ability for multiple parties to connect through a network that facilitates payment transactions



Regulatory interoperability

The ability to connect payment systems across different jurisdictions governed by differing regulatory requirements

Source: Visa Economic Empowerment Institute

Technical interoperability

First, processing transactions without additional human intervention is a good thing. That is why *technical interoperability*, or the ability to facilitate payment transactions between different applications and infrastructure to enable straight-through processing, is so important—but it is also difficult to implement. The more manual interventions or bespoke technical translation systems needed, the higher the potential inefficiencies in the overall network. Discussions of technical interoperability often involve standards. Global standards form the backbone of the global payment system, enabling ubiquity by creating a common set of protocols and specifications that payment service providers can adopt anywhere in the world while still preserving the ability to foster innovation. Further, global standards enable closed-loop payment systems to become open-loop systems and remove significant technical barriers, making it easier for new providers of payment services to connect to the broader payment system. Message standards continue to be important in creating greater interoperability and continue to evolve as payment technology advances. ISO 20022, for instance, is an increasingly important financial

⁴ With apologies to Raymond Carver.

⁵ AFI is a policy leadership organization owned and led by member central banks and financial regulatory institutions with the objective of advancing financial inclusion at the country, regional, and international levels (<https://www.afi-global.org/about/>).

messaging and data standard supporting many use cases in the financial sector. Specific business areas include payments and cash management, cards, trade services, and securities.⁶

Network interoperability

Second, *network interoperability* is the ability for multiple parties and schemes to connect through a network that facilitates payment transactions. Here, technical interoperability is also important to avoid manual intervention. Yet although technical interoperability is important, it is not enough to ensure a network is fully interoperable. Rules governing the system are essential for building trust and reliability, as are additional capabilities that mitigate ecosystem risk and encourage greater participation. This type of interoperability also includes inter-network connections, either bilaterally or through a “network of networks.” Inter-network connections are increasingly important as new payment networks proliferate around the world. In this era of payment modernization, network interoperability has become a focus.

A growing number of countries are establishing faster payment systems (FPSs), often with retail payment capabilities. As of February 2021, at least 56 countries already had FPS capabilities, and many more are in the process of developing them (FIS Financial, 2020). There is, understandably, strong interest in these new systems working together across borders. This discussion is also relevant to the accelerating interest in central bank digital currencies (CBDCs). There is a desire to design them in ways to facilitate cross-ledger (and therefore cross-border) money movement.

In the context of payments modernization (including FPSs and CBDCs), open access is a key consideration. In addition to enabling connections between financial institutions and nonbank fintechs, allowing open access to value added service providers creates greater trust and ubiquity in the retail payment system, encouraging broader adoption and usage. Value added services include risk and fraud analytics, tokenization, and directory services. These services are critical in creating a payment system that is safe and efficient, and trusted by both consumers and merchants.

Regulatory interoperability

Finally, *regulatory interoperability* is the ability to connect payment systems across different jurisdictions governed by differing (and often contradictory) regulatory requirements in order to ensure that transactions are conducted in a lawful manner. Because regulatory interoperability, done well, enables the other two types, it is perhaps the most important to make progress on. Regulatory interoperability includes a broad variety of policies, such as data and privacy, consumer protection, and dispute management. Regulatory interoperability thus goes beyond the technology and network rules governing domestic payment infrastructure to require enhanced international cooperation (e.g., treaties, international organization) in order to facilitate transactions.

So that they can ensure financial system interoperability among different domestic payment systems, some countries are codifying their commitments to global standards into trade and other cooperative agreements. These countries are entering into agreements that seek to encourage the adoption and promotion of international standards as a way to enable technical and network interoperability, as well as creating a means of reconciling differences in regulatory regimes governing payment systems.

As a laudable example, within the recent Singapore-Australia Digital Economy Agreement, both countries have made pledges to support greater interoperability, particularly in response to growth in “non-bank, non-financial institution and FinTech enterprises.”⁷ In the agreement, the countries pledge to support “the development of efficient, safe and secure cross-border electronic payments by: (a) fostering the adoption and use of internationally accepted standards for electronic payments [and] promoting interoperability.”⁸ Relatedly,

⁶ For examples and further details on key messaging standards, see ISO’s pages on [ISO 8583](#) and [ISO 20022](#).

⁷ Singapore-Australia Digital Economy Agreement, Article 11.1

⁸ Ibid.

the agreement also includes commitments to adopt ISO 20022 for “relevant” payment systems, and encourages the use of application programming interfaces (APIs) as a way of including third-party participation in the payment system. The Digital Economy Partnership Agreement between Chile, Singapore, and New Zealand makes similar commitments.

Potential pitfalls in discussions of interoperability

There is a general consensus that interoperability is a way to improve outcomes for people and businesses, but interoperability discussions can take some unhelpful turns. Sometimes uniformity is desired as a shortcut to achieve interoperability. While payments could be perceived to be more interoperable if they all traveled on a common rail provided by a benign public authority, we could find ourselves “at the lowest common denominator” of consumer experience and capability with this approach. Resilience can also be harmed by such an approach—multiple connections are likely better than one route. Every time our search for interoperability lands us in a place where we think one platform/one route is the answer, we should turn back because we could be damaging resilience by introducing possible single points of failure. Payments innovation follows the lead of commerce. For payments to be “one size fits all,” commerce would have to follow a set pattern. When one considers the innovations in retail, in-app, person-to-person, and government-to-citizen payment flows over the past five years, it becomes clear that change is the only constant.

We also have to be careful with how much we expect of standards, APIs, and regulatory harmonization—at least in isolation. Standards are perhaps the unsung heroes in the history of payments. In the 1970s, for example, Visa helped establish a standard for the size and thickness of a payment card. The standard helped point-of-sale device manufacturers build interoperable machines, which has been hugely influential in commerce for decades. But that standard has become meaningless in the e-commerce environment. Standards will not solve financial inclusion by themselves, no more than ISO 20022 alone will fix cross-border payment frictions. Also, standards need to be able to support rapid change, allowing innovation to happen within the standards rather than outside of them.

APIs will probably play a starring role in the next chapter of payments lore. The use of APIs, though, seems to be thriving in regions with a lighter touch around their design. APIs will be a valuable tool for interoperability, but striving for uniformity can stifle innovation. In the context of regulatory streamlining and trade agreements, the goal of “seamless” can lead to paralysis. Good trade agreements know how to loosen the uniformity “grip” just a bit and allow each country to achieve its individual objectives through its own domestic means within a framework that fosters compatibility and advances the mutual goal of increased commerce.

Where we go from here

Open, interoperable payments help power the digital economy. Recent research has demonstrated that micro, small, and medium enterprises that had adopted digital payment capabilities and plugged into digital marketplaces were more resilient during the pandemic and economic crisis and that they are more optimistic for the future (VEEI, 2021). Interoperability has been important for this adoption and will play a key role in digitally enabling people and small businesses in the future. Getting digital enablement right will require public authorities, standard-setting bodies, development finance institutions, and the private sector to reach a shared understanding of which barriers must be overcome. Reaching common goals and metrics for technical, network, and regulatory interoperability is an essential next step toward the ultimate goal of a more equitable and inclusive payment system. Next time we all talk about interoperability, let’s remember that we are really talking about building a more connected world.

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About the Visa Economic Empowerment Institute

The VEEI is a non-partisan center of excellence for research and public-private dialogue established by Visa.

The VEEI's overarching mission is to promote public policies that empower individuals, small businesses, and economies. It produces research and insights that inform long-term policy within the global payments ecosystem. Visa established the VEEI as the next step in its ongoing work to remove barriers to economic empowerment and to create more inclusive, equitable economic opportunities for everyone, everywhere.

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