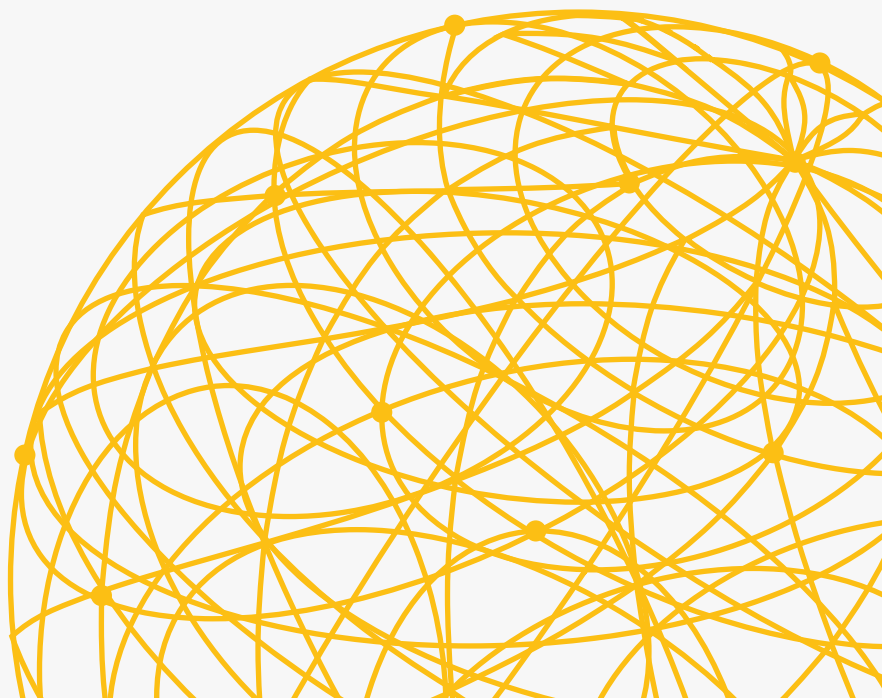




Decoding ISO 20022: Lessons for cross-border payments



This paper builds on the foundational work of *Demystifying ISO 20022* and explores another perspective that is often overlooked—the uniqueness of different use cases and payment methods and the implications of a broad-based approach to ISO 20022 implementation in cross-border payments. To address these challenges, policymakers and the financial services industry can leverage insights from past ISO 20022 implementations, while also applying lessons learned from the cards ecosystem to modernize different payments systems, enhance interoperability, and foster an environment for innovation.

Keywords: messaging standards, ISO 20022, cross-border payments, fast payment systems, RTP, instant payments, SEPA, ISO 8583, API



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

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 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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 Imagining an open
future for payments

Decoding ISO 20022: Lessons for cross-border payments



Visa Economic Empowerment Institute

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Introduction

A business in Argentina pays for supplies purchased in the Philippines using the conventional correspondent banking system crucial to support global trade today. But it's slow, taking days for the payment to arrive, and there is no guarantee the full amount will reach the seller. International payments are complex. They rely on a correspondent banking system involving wire transfers that must navigate a web of domestic payment systems across different jurisdictions, each with varying cutoff times, a lack of visibility, certainty, and predictability. That may soon change with a broad adoption of ISO 20022 worldwide, which can help to alleviate some of the major challenges we see in payments that rely on traditional correspondent banking models today.

Marching to ISO 20022

According to the Bank for International Settlements' (BIS) Committee on Payments and Market Infrastructures (CPMI, 2023), fragmented and mixed use of standards in payments messaging are chief contributors to frictions in cross-border payments today. For payments to flow freely across borders, payment systems need to be able to “talk” to each other. But for years, proprietary payment messages¹ have grown in complexity, especially for international noncard transactions that can require multiple steps to process.

It is widely expected that ISO 20022 will play a key role in cross-border payments interoperability. The year 2023 marks a pivotal moment in the payments industry. The adoption of ISO 20022—a common language in data exchange between financial institutions—promises to lessen the long-standing challenges that have constrained many forms of cross-border payment flows. With richer, valuable payment data in structured fields within the ISO 20022 standard, the transaction flows of major reserve currencies can be routed more efficiently across borders—laying the foundation for streamlined compliance procedures, enhanced customer experiences, and the building blocks of innovation.

In March 2023, more than 11,000 institutions worldwide rewired their high-value payment systems² from legacy proprietary formats to ISO 20022 and adopted the global messaging standard for domestic and cross-border payments. The financial inter-bank messaging network Swift (2020) forecasts that almost 80 percent of all international low and high-value payments will be processed using ISO 20022 by 2025. Yet, in September 2023, Swift declared that only 15 percent of outgoing messages were in ISO 20022 form (Finextra, 2023) suggesting that achieving widespread adoption takes time and will not be straightforward.

Given the promise of addressing inefficiencies in cross-border transactions, the Financial Stability Board (FSB, 2020) and the CPMI prominently feature ISO 20022 as a critical element of the G20 Cross-Border Roadmap in payments data exchange and interoperability. However, as the earlier Visa Economic Empowerment Institute paper on ISO 20022 notes, “while the benefits for financial services will be net positive, benefits will be limited for domains already using international standards (i.e., retail card payments)” (Gallaher & Harper, 2022).

¹ Proprietary payment messages are unique message formats defined by a country, region, or monetary authority for facilitating payments. ² High value payments systems or large value payment systems are real-time gross settlement systems used for wholesale, or high value interbank electronic transfers.

Moving ISO 20022 migration timelines

Although ISO 20022 is set to become the de facto standard in noncard payment transactions, the journey has been long and fraught with challenges. Even with extensive preparation the global financial community faced years of delays and false starts.

For one, the proposed migration strategies have been a moving target for the financial services community (see Box 1). In 2019, Swift mandated its member banks to adopt the new standard for cross-border payments (known as CBPR+), moving from the old MT format to the richer MX data³, beginning in 2021; The date was later pushed out to 2022. Still, many financial institutions found themselves with limited resources to meet the extended roll-out deadline and the deadline was delayed again to the first quarter of 2023 (Payments Market Practice Group [PMPG], 2022).

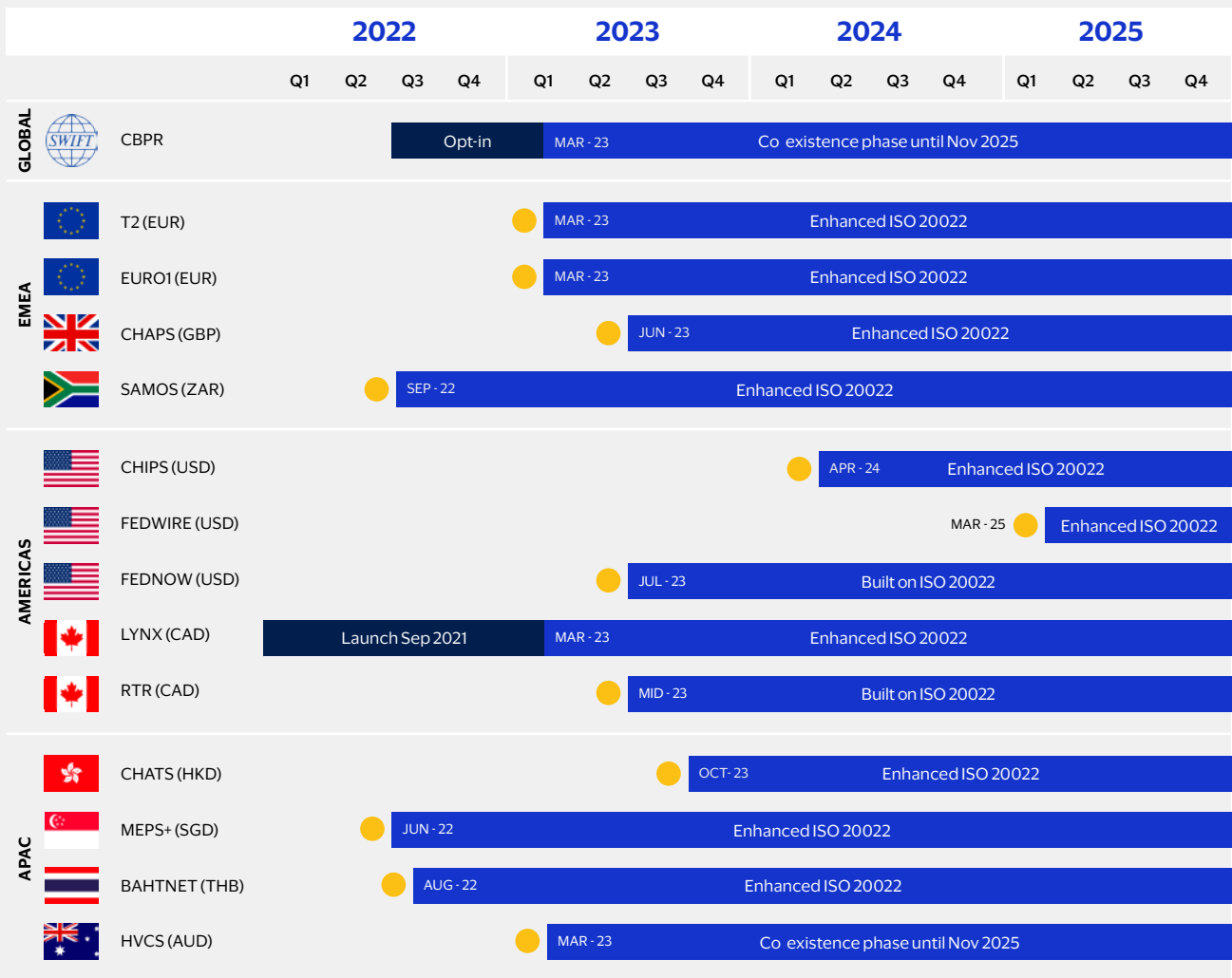
There are hundreds of publications on ISO 20022, including a focus on how the standard can unlock tremendous value in financial services (Quibria, 2015). While the benefits and promise of ISO 20022 are widely recognized in the payments space, the issues in the adoption and implementation process, including the uneven impact across different domains, are often not discussed. This paper explores the needs of different users, use cases, and payment types—providing a perspective often missing in the discourse of ISO 20022 implementation, the various policies, and other considerations of a broad-based approach. The first section presents the challenges and risks in a large-scale migration program and builds on insights from past ISO 20022 implementations to address them. The second section offers key learnings from the retail card payments ecosystem experience with existing messaging standards that can be applied to ISO 20022.

³ Swift MT is a legacy non-XML proprietary message format. MX messages are ISO 20022 XML-based replacement for MT messages.

Box 1: Shifting ISO 20022 adoption timelines

The European Central Bank (ECB, 2023) postponed the launch of its new wholesale payment system, T2, from November 2022 to March 2023, granting participants more time for testing in a stable environment. This delay was influenced by the significant and systemic nature of T2's central liquidity tool, as well as the potential impact of the uncertain geopolitical and volatile financial markets landscape (ECB, 2022). The ECB's and Swift's adjusted schedules also triggered a ripple effect prompting the European Banking Authority Clearing (EBA Clearing, 2023) to align its migration plan with the ECB's revised strategy.

Figure 1: Global ISO 20022 migration timelines in select geographies



Source: Authors' analysis

Recognizing the substantial technological and operational challenges market participants faced in upgrading their systems for ISO 20022 messaging requirements, the Bank of England extended the CHAPS (Clearing House Automated Payment System) conversion deadline multiple times from June 2022 to April 2023 and later to June 2023 (International Banker, 2022; Bank of England, 2023).

Payments Canada embarked on the modernization of its financial infrastructure as far back as 2015, culminating in the retirement of the proprietary real-time gross settlement system (RTGS) in September 2021, with the introduction of the new LYNX system. It took several more years to enable support for end-to-end delivery of ISO 20022 messages, aligning with Swift's timeline to maintain operational and business continuity (Payments Canada, 2023).

In the United States, both public and private sector operators made multiple adjustments to their transition timelines. Looking ahead, The Clearing House's (2023) high-value payments system CHIPS (Clearing House Interbank Payments System) is slated to go live in April 2024 having been rescheduled from November 2023. The Federal Reserve (2023) is set to address its implementation by March 2025, although there could be another shift in the target date.

Finding solutions in ISO 20022 implementations

ISO 20022 is often framed as a panacea for many of the frictions in the banking and larger financial ecosystem. Indeed, it can have a profound impact on new payment infrastructure (like faster payment solutions) and other modernization efforts (such as real-time gross settlement systems) in achieving interoperability across networks and driving down costs by eliminating manual intervention and reducing errors, making transactions faster, efficient, and more secure.

Internal infrastructure and processing barriers

However, converting to ISO 20022 is a massive undertaking that cannot be underscored enough. A significant implementation effort in an ISO 20022 transformation is the complexity of orchestrating the changes to the legacy systems that many financial institutions and market infrastructures rely on. A project of such magnitude requires an architectural transformation of internal payment processing from the front-end interface to the back-end systems (and more so if the intent is to design for added future business value). In a typical bank environment, the aging infrastructures are not easily compatible with ISO 20022, which means introducing changes to a number of impacted applications in addition to performing high-volume testing with many industry partners before migration can even start (Deutsche Bank, 2023). This type of effort also requires strong collaboration and a proactive flow of information across all functions, including technology, business, operations, treasury, marketing, and more.

Embracing a new language

An essential aspect that requires attention is raising awareness and providing education about ISO 20022. Many payments professionals are unprepared for the considerable adjustment in terminology and the unique operational procedures it entails. Creating a well-designed educational campaign for market participants is crucial—including providing guidance on new vocabulary and how the enhanced transaction details affect input applications and downstream processes. This effort will help reduce disruptions and confusion within the industry, allowing industry participants to better prepare for the transition.

Performance challenges with message size

Moreover, market participants need to consider the impact of transitioning to the richer ISO 20022 eXtensible Markup Language (XML)-based financial messages that have extended fields and hierarchical data elements. An environment relying on legacy infrastructures may not be equipped to support the higher capacity and throughput of larger files and increased volumes of transaction data. The verbose nature of the highly structured ISO 20022 based XML format not only makes transmission less efficient, leading to performance and bandwidth issues, but

it also demands increased disk storage and warehousing (Quibria, 2015). Despite the prospect of growing computer power enhancing network and processing capacities, there is still a need for a more compact format that leverages application programming interfaces (APIs). However, progress on ISO 20022-compatible API standards remains limited and reaching consensus on such standards will take time. In response to these considerations, the CPMI (2023) established a panel of market participant experts to promote the harmonization of API protocols for cross-border payments earlier this year.

Dimensions of data overpopulation

As payment market infrastructures around the globe migrate from proprietary formats with limited characters to the richer ISO 20022, one key benefit is mitigating the issue of data loss and data truncation commonly experienced within some payment sectors due to unique and localized message sets. Correspondingly, ISO 20022 introduces a new and different challenge. With the enhanced data in the ISO 20022 message, the risks from unexpected additional data (or data overpopulation) remain unclear, especially concerning combating money laundering and the financing of terrorism (AML/CFT). Some market participants ignore or drop the surplus information as the message flows through the internal chain and into the respective clearing systems. Conversely, others perform sanctions screening and pass the information along in the outbound message before archiving the original file. Additional content brings further potential concerns, including security and privacy issues and the possible heightened risk of data exposure (Quibria, 2015). A consistent data framework is needed to govern this data exchange.

Balancing transparency and trust

Improved transparency is another consideration for cross-border payments. Outside of retail card transactions, the tracking of payment status for international transactions can be a lengthy and manual process involving different time zones, reliance on intermediaries, and limitations in consistent tracking information. Distinct privacy and data protection laws, many of which differ by jurisdiction, add another layer of complexity. Varying regulations and requirements can further hinder the disclosure of fees and charges. As many countries seek to protect the data or personal information of citizens and corporations, navigating associated policies and laws can be a complex undertaking. Increased coordination and harmonization between financial regulators and agencies responsible for privacy and data use policies will be key to building transparency and trust.

Flavors and fragmentation

While ISO 20022 holds the promise of borderless payments, delivering on that promise could be unobtainable for some years. And with Swift's co-existence of using existing systems in parallel with ISO 20022 messages until November 2025, the financial services ecosystem must continue to handle both the older and more modern standards. However, because processes and procedures are not interchangeable between the two, market participants face a significant burden in supporting multiple standards. Even after the November 2025 deadline passes, a key issue facing the industry will be the divergence of how data is exchanged. Without alignment and strong public-private sector collaboration, ISO 20022 may not be consistently adopted within the payment sector and across different regions, which will compound inefficiencies in cross-border payment flows and interoperability may not be fully realized.

Not all payments are created equal: Lessons in modernization and innovation from the retail card ecosystem

To address the risks of fragmentation and other challenges, in March 2023 the CPMI (2023) launched a formal consultation on harmonization requirements for the use of ISO 20022 in cross-border transactions so payment systems and networks could get closer to achieving interoperability by speaking the same language.

However, in view of the complexity and magnitude of ISO 20022 conversion projects, applying a one-size-fits-all approach to all payment types can also introduce significant risks to a fragile and complex payments ecosystem because different end users have different needs. There are lessons to be drawn from the retail card ecosystem, which brings with it more than 40 years of experience effectively utilizing ISO 8583 messaging for retail card payments, that can guide the broader adoption of ISO 20022 within the financial services sector.

Box 2: ISO 20022: Cards versus other payment types

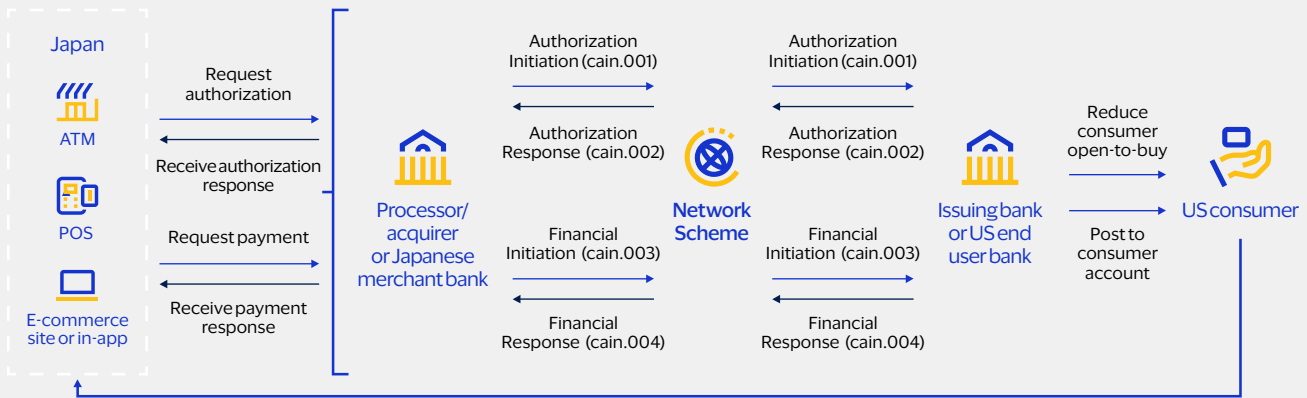
As a financial instrument, cards come with distinctive demands, attributed to their consumer-facing nature and high-volume requirements. Retail card messaging has unique characteristics, designed for real-time authorization, ensuring efficiency, speed, and high throughput. Additional components are incorporated to address security, transaction approval, and compliance with network rules and regulations. In the case of Visa, authorization must be executed in milliseconds, reaching an ever-growing network of 7 billion endpoints, and orchestrated to function 24x7x365 (Visa, 2023).

Exhibit A: Cards domain—a complex ecosystem

The diagram below provides a high-level view of the intricate ecosystem that supports retail card transactions. Distinctive message structures, settlement methods, and funding mechanisms highlight the variances. Card transactions involve numerous stakeholders

engaged in diverse interactions, each accompanied by specific requirements. The Acquirer-to-Issuer Card Messages (ATICA) within ISO 20022 encompass authorization, verification, financial clearing, settlement, and reporting (replicating ISO 8583 messaging). Notably, processes like rejection, reversal, and other exceptions are integral, even though they are not highlighted below. Furthermore, the proliferation of diverse endpoints, spanning mobile phones, point-of-sale devices, ATMs, and e-commerce platforms, has direct implications on the card payment message set.

Figure 2: Cross-border card payment transaction flow | Acquirer-to-Issuer Cards Messages (ATICA)



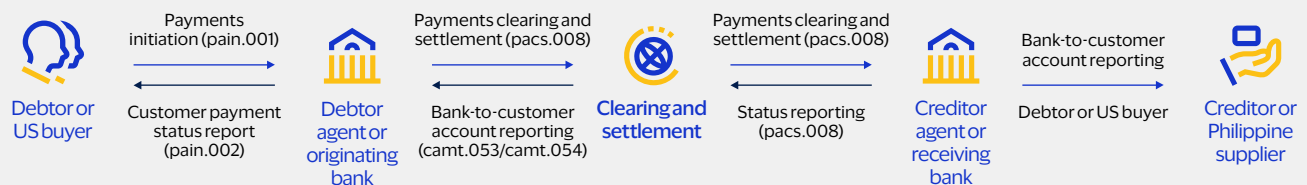
Source: Authors' analysis

Exhibit B: Payments domain—cross-border settlement funds transfer

In contrast, comparing non-card payment systems (i.e., high-value, low-value, or instant payments) with card transactions underscores the inherent differences between the use cases. Due to the unique attributes of card transactions and non-card transactions, ISO 20022 standards classify them into separate “Cards” and “Payments” domains.

Although the cross-border payments value chain may involve many intermediaries, data flows can be harmonized more easily with common elements. This alignment encompasses payment initiation (pain) instructions, payments clearing and settlement (pacs) messages, and the final leg in bank-to-customer account reporting (camt) messages.

Figure 3: Cross-border settlement funds transfer



Source: Authors' analysis

Developing a business case

Today, there is an absence of a compelling business justification for a wholesale transformation to ISO 20022 across all sectors of the financial services industry because different users have different needs. Different payment systems like the faster payment schemes in the United Kingdom and in India, rely on ISO 8583—an internationally-accepted financial messaging standard for card-initiated transactions. ISO 8583 offers essential benefits including crucial customer authentication features.

ISO 20022 is acknowledged for its distinct advantages over the existing formats like ISO 8583, which faces limitations in data length and size, and that necessitates trade-offs when introducing new data. While ISO 20022 represents improvements in enhanced and more granular data for financial use cases such as wires, ISO 8583 supports vital aspects of progress lacking in other cross-border payments. Notably, ISO 8583, as a single unified standard, brings interoperability and speed in a crucial leg of the transaction journey. Consequently, the significant costs associated with migrating to ISO 20022 outweigh the marginal benefits, especially when industry participants, such as merchants, vendors, and the broader ecosystem, must update their technologies to communicate effectively with their banking partners.

Lift to the ecosystem: Moving beyond version numbers and maintenance cycles

Another factor is upgrading to a newer version of ISO 20022 can have wide-ranging implications. The last large-scale adoption of ISO 20022 happened more than a decade ago, when financial institutions went through a regional regulatory project to create the Single European Payments Area (SEPA) for euro payments.⁴ The European Payments Council (2022) will migrate to the 2019 version of ISO 20022 for the first time since 2009, with banks and Payment Service Providers (PSPs) updating their interbank communications in payments starting in March 2025 (Finextra, 2023).

Similarly, the process of updating the ISO 20022 standard itself is a lengthy effort (taking anywhere from two to three years), with the need to align to Swift's annual standard release, which has its own set of complexities before it enters the market. In contrast, modifications to the 8583 messages can be implemented at various times throughout the year to keep pace with the evolving regulatory landscape and the ever-changing needs of end users because the standard does not necessitate changing a version number or adhering to rigid maintenance cycles.

As the financial services industry embraces ISO 20022 implementation, a valuable lesson from the card ecosystem is the importance of maintaining flexible and agile maintenance cycles. This adaptability is crucial for navigating the ever-evolving regulatory changes and market-led innovation occurring in different jurisdictions at different times. Additionally, such flexibility should accommodate the unique needs of different financial sectors and account for innovation occurring at different rates worldwide.

⁴ SEPA harmonized the execution of payment instructions in foreign currencies and adopted a common data format.

Meeting the needs of evolving end user expectations

The rise of 24/7 real-time connectivity is rapidly transforming end user preferences. Increasingly, consumers and businesses expect successful payment experiences anytime, anywhere, both locally and across borders.

In the realm of retail card payments, a complex series of actions must unfold in a matter of milliseconds, encompassing authorization, fraud detection, approval, and the completion of the card transaction. For example, the Visa (2022) network is capable of processing 76,000 messages per second and managing hundreds of millions of transactions daily. To maintain these capabilities, a telecommunications network spanning ten million miles must be available at 99.9999 percent uptime to handle surges in transaction volume. Over the last ten years, Visa has spent more than \$3 billion on artificial intelligence (AI) and data infrastructure to enable the safer, smarter movement of money and to proactively identify and prevent fraud (Taneja, 2023).

The larger message size of ISO 20022 messages makes them less suitable for mobile and other digital channels where speed and high transaction volumes are paramount. Notably, certain faster payment systems, like India's Unified Payments Interface (UPI), rely on the ISO 8583 message because it is a card-based format that accommodates limited bandwidth, storage, and processing capabilities (World Bank, 2022). Until ISO 20022 can effectively adapt to the new digital economy, particularly in high-speed, high-volume scenarios, both existing internationally-accepted and proprietary formats will persist. To that end, the development of flattened messages and lean APIs will serve as vital technical enablers in driving broader adoption of ISO 20022.

ISO 20022 is at a crossroads

The ongoing transformation of market infrastructures is set to fuel global momentum in ISO 20022 adoption. Many payment networks are now recognizing the advantages of ISO 20022 and are considering its integration into both existing and new infrastructures, where it aligns with business goals. However, the full worldwide rollout of ISO 20022 will be a multi-year endeavor.

As the payments industry continues its ISO 20022 journey, it is crucial for policymakers and financial institutions to assess the broader impact on a complex payments ecosystem. They should carefully weigh the risks, especially those unique to each financial services sector, and prepare for the transition. Learning from the well-established card space and its historical development is also vital. Factors to consider include:

- developing rapid transaction processing,
- developing high volume transaction requirements,
- ensuring interoperability within specific payment domains,
- ensuring robust transaction security, and
- evaluating the impact on existing value-added services.

Finding the right balance between a unified approach to standardization across varying payment sectors and accommodating the unique demands of specific regions and payment types will be essential in the evaluation process as the private and public sectors move forward.

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