A framework for the interlinking of instant payment systems

WHITE PAPER

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Contents

Executive summary

The linking of instant payment systems (IPSs) holds promise to improve the efficiency of cross-border payments. However, interoperability barriers threaten to limit the potential of IPS links to support the ambitions of G20's Roadmap for Enhancing Cross-border Payments ("G20 Roadmap"). While it is widely acknowledged these barriers must be addressed, we argue there is also a need to look a level deeper and design governance, commercial and technical models that promote the adoption, scale and viability of linked arrangements. Critically, the views of payment system participants should be considered from start to finish of the development process.

"We provide a potential framework - of four foundational principles and five supporting pillars - to find a common path forward in the linking of IPSs."

IPSs exist in approximately 100 jurisdictions around the world, with more jurisdictions considering establishing this infrastructure in the near future.[1] Domestically, IPSs present an instant, 24x7, low-cost payment option to end-users. Given these benefits, it is unsurprising that real-time payments are expected to account for 27.8% of all electronic payments globally in 2027 (an increase from 18% in 2022).[2] When applied to a cross-border context, the linking of IPSs has the potential to support faster, cheaper, more transparent and more accessible cross-border flows, in line with the ambitions of the G20 Roadmap.

27.8%

The expected share of real-time payments of electronic payments globally in 2027 (an increase from 18% in 2022)

Several bilateral links between domestic IPSs are now live, often between jurisdictions with aligned economic and policy objectives.[3] However, reaching the point of go-live requires the alignment of technical, regulatory and legal standards. Such alignment often involves complex negotiations by the jurisdictions involved, sometimes necessitating sustained political will to change existing regulations or standards. Further, there are often barriers to effectively scaling bilateral links as each new link requires separate technical integration projects and associated investment for financial institutions and domestic IPS operators.[4]

While establishing a multilateral model would alleviate some of the scaling challenges inherent in bilateral IPS links, interoperability barriers do not fully disappear with a single technical interface. In actuality, multilateral IPS links introduce new, potentially more complex, questions as more jurisdictions, and thereby IPSs, join the arrangement. For example, aligning the data transfer requirements of five jurisdictions may be far more challenging than two jurisdictions depending on the variance of the requirements involved.

At Mastercard, we are committed to a world where cross-border payments are seamless, simple and secure. While many of the interoperability barriers to IPS links are increasingly well-known, greater attention should be given to the underlying governance, commercial and technical models of linked arrangements. A new framework based on understood foundational principles, coupled with supporting pillars to promote the arrangement's adoption, scale and viability could be leveraged by payment system participants, policymakers and central banks when assessing potential paths forward in the linking of IPSs. (See Graphic 1 for visual of framework.)

1. World Bank, "The Future of Fast Payments," October 2023.
2. ACI Worldwide, "It's Prime Time for Real-Time," March 2023.
3. Live IPS bilateral links include, but are not limited to: Singapore/Malaysia; Singapore/Thailand; Malaysia/Thailand; Malaysia/Indonesia; Thailand/Indonesia; Thailand/Vietnam; Thailand/Cambodia; and Thailand/Japan.
4. For example, according to the Project Nexus blueprint a network of five countries requires 10 country-to-country links but a network of 10 countries requires 45 links.

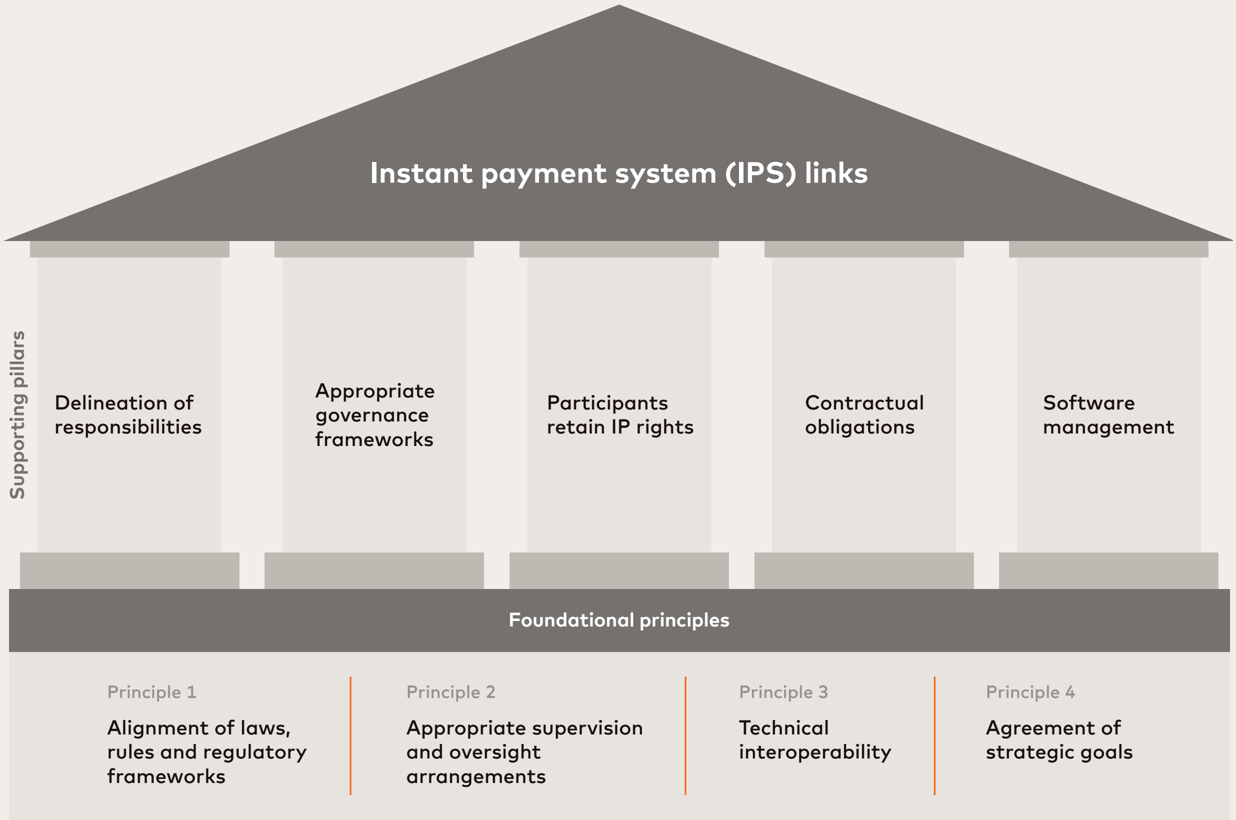
There are four foundational principles that are acknowledged and actively debated today:

- **Alignment of laws, rules and regulatory frameworks,** a process that may require decisions between conflicting policy priorities (for example, faster and cheaper payments against issues such as privacy and anti-money laundering (AML) rules)
- **Establishing appropriate supervision and oversight arrangements,** which prioritize neutrality and consider a proportionate approach to supervision and oversight
- **Technical interoperability,** including the alignment of messaging standards
- **Agreement of strategic goals for the linked arrangement,** at a minimum ensuring alignment of economic and policy objectives

Building off this foundation, five supporting pillars focused on appropriate governance, commercial and technical models enable IPS links to go from concept to go-live by incentivizing stakeholder participation, promoting adoption and facilitating scale and viability. These five supporting pillars include:

- **Proper delineation of responsibilities between the scheme owner, technical operator and IPSs,** ensuring the technical operator controls and is accountable for key processes including the technology stack, product roadmap (including services) and fee level
- **Appropriate governance frameworks,** based on the division of responsibilities between the scheme owner, technical operator and IPSs
- **Participants of the linked arrangement retain intellectual property (IP) rights,** enabling the technical operator to utilize its IP to provide similar products and services to the market
- **Establishment of contractual arrangements that promote time to market,** by appropriately dividing liability between the scheme owner, technical operator and IPSs
- **Consideration of the nuances and complexities in software management,** including the decision to buy or build

Graphic 1: Foundational principles and supporting pillars for IPS links



Laying the foundations

"...policymakers and governments must work together to consider questions that could present conflicting policy objectives."

The development of a linked arrangement is dependent upon the jurisdictions and/or entities involved agreeing on certain foundational principles. Therefore, the importance of getting these principles "right" is paramount to the eventual creation of governance, commercial and technical models for the linked arrangement. Depending on the starting point (that is, the degree of variance between jurisdictions), alignment may be easily achieved or there may be insurmountable barriers and differences.

PRINCIPLE 1

Alignment of laws, rules and regulatory frameworks

Jurisdictions seeking to link domestic IPSs may not have the same or fully harmonized legal and regulatory frameworks. Alignment of these frameworks is often required, sometimes necessitating new or amended legislation (with corresponding political will) to effect seamless cross-border payments. To reach this end-state, policymakers and governments must work together to consider questions that could present conflicting policy objectives. Key questions include, but are not limited to, the following:

- **Is there a need to align existing AML/combating the financing of terrorism requirements?** If so, do the benefits of faster, cheaper, more transparent and more accessible cross-border payments outweigh the potential costs and risks introduced by harmonizing these requirements?
- **Do the jurisdictions of the linked arrangement have existing or planned data localization requirements that prohibit or severely limit the transfer of data outside of their borders?** If so, how will the conflicting policy objectives of protecting the privacy of citizens and faster and cheaper cross-border payments be resolved?[5]
- **Is new or additional settlement finality legislation required?** If so, is there political will to pass such legislation? If legislation exists, is alignment (requiring amendments) needed?

5. Of note, a report by the Organization for Economic Co-operation and Development found that in 2021, 92 measures across 39 countries mandated data be stored or processed domestically. Further, over half of these measures were implemented in the five years prior.

"The location of the legal entity may dictate not only the main supervisory authority for the linked arrangement, but also the chair of any cooperative oversight arrangement."

"Proportionality in the application of supervisory and oversight frameworks is necessary to avoid a one-size-fits all, and potentially unduly burdensome, approach."

PRINCIPLE 2

Appropriate supervision and oversight arrangements

Consensus on appropriate supervision and oversight arrangements for the linked arrangement is necessary amongst participating jurisdictions. However, a preliminary decision that influences supervision and oversight is the location (that is, jurisdiction) of the legal entity of the linked arrangement. The location of the legal entity may dictate not only the main supervisory authority for the linked arrangement, but also the chair of any cooperative oversight arrangement.[6] For certain linked arrangements the location of legal entity may be self-evident, for example when there are clear economic or market drivers, such as dominant use of one jurisdiction's currency. For other linked arrangements, the choice of legal entity location may not be as obvious. As a result, elements of trust in a jurisdiction's rule of law, resistance to domestic pressures and the ability to defend against geopolitical influences may be factored into any decision. In essence, neutrality in supervision and oversight is crucial for the adoption, scale and long-term viability of the linked arrangement.

Proportionality in the application of supervisory and oversight frameworks is necessary to avoid a one-size-fits all, and potentially unduly burdensome, approach. The degree of risk and complexity of activities, as well as level of volumes and values, should result in a risk-based, proportionate approach to the supervision and oversight of linked arrangements. Specific to oversight, flexibility can be achieved via:

- Re-evaluating the risk profile and adjusting oversight as required
- Establishing cooperative oversight arrangements that are informal when risks/complexities/volumes/values are low, but mature to more formal arrangements, such as memorandum of understanding or protocols, should risks/complexities/volumes/values increase over time
- Maintaining an open dialogue between overseers and the linked arrangement on emerging risks and operational trends

PRINCIPLE 3

Technical interoperability

Technical interoperability between participants of the linked arrangement, and the ease of facilitating that interoperability, will influence the time to market, adoption, scale and viability of the linked arrangement. Focusing on IPS participants, these entities may need to make significant investment (both in time and money) to align existing messaging standards, processes, technologies and infrastructure to connect to the linked arrangement. Interoperability considerations include, but are not limited to:

- Alignment of messaging standards (for example, to industry best practice or amongst participating jurisdictions)
- Diverging approaches to exception handling processes
- Differences in access criteria, particularly when connecting IPSs do or do not allow direct access to certain market participants (for example, non-banks)
- Ability (technical and/or legal) to leverage certain technologies (for example, cloud) for data storage

6. As seen with CLS, a systemically important FX settlement system, where the Federal Reserve acts as both the supervisory agency and chair/secretariat of the CLS oversight committee.

Agreement of strategic goals for the linked arrangement

Jurisdictions seeking to connect domestic IPSs should be aligned in their strategic goals for the linked arrangement. Such mutual objectives can pertain to financial inclusion, furthering regional economic and financial integration, promoting the use (and resulting values and volumes) of domestic IPSs, or enabling the achievement of policy priorities such as the cost, speed, access and transparency targets outlined in the G20 Roadmap.

> "...a clear use case for the linked arrangement helps promote adoption, scale and viability."

Importantly, a clear use case for the linked arrangement helps promote adoption, scale and viability. Investment costs for building the linked arrangement (at the appropriate level of resiliency and user protections, and with a compelling set of features) may be high. Large transaction volumes resulting from a viable use case that appropriately addresses existing inefficiencies and user demand may enable participants of the linked arrangement to mitigate investment and commercial risks (particularly for not-for-profit models). Ultimately, the linking of IPSs should not be a solution looking for a problem or forced upon payment system participants.

Constructing the supporting pillars

Building off this solid foundation, we identify five supporting pillars to facilitate the development of governance, commercial and technical models for linked arrangements. While there may be other factors that influence these models, these pillars are intended to provide a starting point for debate and consideration.

"The delineation of responsibilities between the scheme owner, technical operator and IPS will influence... the willingness of payment system participants to serve in these roles and utilize the linked arrangement for cross-border payments."

PILLAR 1

Proper delineation of responsibilities between the scheme owner, technical operator and IPS

The delineation of responsibilities between the scheme owner, technical operator and IPS will influence not only the governance and contractual obligations of a linked arrangement, but the willingness of payment system participants to serve in these roles and utilize the linked arrangement for cross-border payments.

A potential delineation of responsibilities is outlined in **Graphic 2,** but at a high level:

- The **scheme owner** defines and manages the scheme rules, and admits entities (that is, the technical operator and IPSs) to the scheme. Additionally, the scheme owner helps ensure ongoing compliance with the scheme's rules by the technical operator and IPSs.
- The **technical operator** provides the day-to-day management and operation of the linked arrangement. Importantly, the technical operator must have control of key end-to-end processes. Such processes include ownership and execution of the product roadmap, ownership of the technology stack, and defining the revenue model and fee structure.

  Without ownership of key end-to-end processes, challenges relating to governance and accountability may arise. For example, if the scheme owner (rather than the technical operator) owns the product roadmap or revenue model, but the technical operator raises issues of concern (for example, resiliency deficiencies or pending upgrades) requiring unplanned investment, who is accountable if these issues are not addressed? The scheme owner (who controls the product roadmap and funding to address the issues raised) or the technical operator?
- **IPSs** manage the relationship with participating financial institutions (FIs), including supporting the onboarding of FIs to the linked arrangement. Additionally, IPSs originate and receive messages and select/contract with a scheme-compliant technical operator.

Graphic 2: Potential delineation of responsibilities

Scheme owner

Dispute resolution: Convene and provide expert determination on escalated disputes.

Eligibility/participation criteria: Define eligibility and participation criteria for the scheme. Monitor compliance of technical operators and IPSs with participation criteria.

Scheme funding: Define funding arrangement for scheme (for example, scheme membership fees, government funding, IPS revenue share and more).

Scheme IP: Own scheme IP (for example, trademarks, copyright, franchise and more).

Scheme roadmap: Define the scheme roadmap (for example, new messages, new payment types, new payment execution time rules and more).

Scheme rules: Define and set business scheme rules (including standards and policies) to govern the payment scheme across critical areas.

Onboarding: Define and manage onboarding and certification procedures for technical operators and IPSs.

Technical operator

Dispute resolution: Responsible for first-line investigation of disputes.

Fees/revenue: Define fee structure, revenue model and funding options with contracted IPSs for services (for example, ongoing maintenance, enhancements, technology upgrades and more). Collect fees from contracted IPSs (for example, joining fee, transaction fee, enhancement/value-add fees).

Gateway: Have the ability to host/provide gateway (if required by IPS).

Incidents/outages: Serve as operational point of contact for contracted IPSs and other connected technical operators for identified and known incidents or outages (responsible for troubleshooting, first-line investigation and resolution of incidents and outages).

Onboarding/training: Onboard to scheme according to onboarding/certification procedure and demonstrate ongoing compliance to scheme owner. Support onboarding of IPSs and their FIs according to scheme onboarding and certification rules (for example, enquiries, test case execution, operational readiness review and more). Guide and provide IPSs with relevant documentation, training and information.

Product roadmap: Define the product roadmap (for example, message transformation services (to/from scheme standard), reporting, IPS UI, security arrangements and more). Execute on product roadmap.

Service provision: Build, operate and maintain services for IPSs (and other technical operators) according to scheme rules.

Technical operator IP: Own and use technical operator IP (for example, patents, trade secrets and more).

Technology stack: Define technology stack and technical standards. Implement technology stack and upgrades.

IPSs

Fees/revenue: Contract with connected FIs (including the setting/collection of fees).

FX: Agree and establish FX arrangements with FIs.

Gateway: Have the ability to host/provide gateway.

Improvements: Coordinate with participating FIs and vendors during implementation and improvement of system/network setup and applications enhancements.

Messaging: Originate and receive messages.

Onboarding/training: Onboard to scheme according to onboarding/certification procedure and demonstrate ongoing compliance to scheme owner. Support onboarding of connected FIs to scheme (for example, enquiries, test case execution, operational readiness review and more). Guide and provide FIs with relevant documentation, training and information.

Service management/processing: Select and contract with a scheme-compliant technical operator and manage service (for example, responsible for safety, security, resilience, efficiency and more). Prepare, modify and test with chosen technical operator to ensure processing of transactions according to scheme rules.

Appropriate governance frameworks

Governance can be defined as the "set of relationships between ... owners, board of directors (or equivalent), management and other relevant parties, including participants, authorities and other stakeholders".[7] For IPS links, the type of governance framework required depends on a variety of factors, including whether the scheme owner and technical operator are the same entity or separate entities, and the division of responsibilities between the scheme owner, technical operator and IPSs. For any scenario, the governance framework should consider accountability, decision-making authority and information flow (for example, between the scheme owner and the technical operator, to the board, to supervisors and overseers). However, the rules for each scenario may differ depending on the owner/operator construct and how responsibilities are allocated.

"The principles of neutrality and inclusiveness should be prioritized in the establishment of governance frameworks to promote the long-term viability of linked arrangements."

The principles of neutrality and inclusiveness should be prioritized in the establishment of governance frameworks to promote the long-term viability of linked arrangements. Specific to neutrality, different operating models may place different stressors on the neutrality of the linked arrangement. For example, conflicts of interest may arise in models where central banks are both the scheme owner and overseer. Careful consideration should be given as to whether the same central bank, as scheme owner, can make objective decisions in the best interest of the linked arrangement and its users, while also carrying out its oversight duties effectively. Additionally, governance frameworks must empower the technical operator of any linked arrangement to take a neutral approach in its day-to-day management of the linked arrangement's operations. If the governance is designed where all decisions require scheme owner's approval, this may result in a delay of time-sensitive payments to the end-user and (potentially) unnecessary risk to the broader payment system.

Relating to inclusiveness, the views of relevant stakeholders (for example, the linked IPSs) could be represented in the governance framework of the linked arrangement. Decisions made at the linked arrangement level may have knock-on implications for participants and other users, including but not limited to changes in processes/protocols, investments in infrastructure/technology/staff and pricing/fees. Representation of stakeholders in the linked arrangement's governance framework could be achieved via seat allocation on the linked arrangement's board, participation in a business advisory and/or operations board committee, and member notices with response periods for major changes under consideration.

7. CPMI-IOSCO, "Principles for financial market infrastructures," April 2012.

PILLAR 3

Participants of the linked arrangement retain IP rights

To encourage private sector support and adoption, each participant in the linked arrangement should retain the right to own and leverage its IP. Particularly in models with not-for-profit ambitions, participants may seek to mitigate the commercial risks of not recuperating the investment in build and run costs. The mitigation of these commercial risks is associated with (at least in part) by the participant's ability to leverage its IP to sell other products and services to the broader market. As a result, other market participants may also benefit from the products and services offered to participants of the linked arrangement (resulting in risk reduction, faster payments and enhanced transparency).

"To encourage private sector support and adoption, each participant in the linked arrangement should retain the right to own and leverage its IP."

For example, a delineation between the IP of the scheme owner and technical operator[8] could enable the scheme owner to retain ownership of scheme-related IP such as trademarks, copyright and franchise. The technical operator would own any patents and/or trade secrets, enabling it to leverage this information for other product and service offerings. Although such a separation of IP may generate concerns of "lock-in" risk (the scheme owner could be tied to a vendor), this risk could be mitigated via the creation of a separate entity or contractual provisions (such as step-in rights).

PILLAR 4

Establishment of contractual arrangements that promote time to market and scale

The number of contracts and division of liability outlined in contractual arrangements will impact time to market and scale of the linked arrangement. As a general principle, fewer contracts can equate to faster time to market. For example, a tri-party contractual negotiation between the scheme owner, technical operator and IPSs may be harder to effect than a two-party agreement (as three parties negotiate and agree on contractual provisions). Additionally, such an arrangement may present challenges to scale, as each time (presumably) a new contract is required between the technical operator, scheme owner and new IPS.

"The number of contracts and division of liability outlined in contractual arrangements will impact time-to-market and scale of the linked arrangement."

However, two-party contractual agreements, where the scheme owner and technical operator are viewed externally as the same entity (normally in cases where the technical operator role is outsourced), may not necessitate faster time to market. Of note, there may need to be an outsourcing agreement between the two parties. The technical operator may need to conform, potentially without much say, to the contractual provisions agreed between the scheme owner and IPSs.

Contractual arrangements should also appropriately divide liability for the linked arrangement's effective functioning amongst the scheme owner, technical operator and IPSs. Any contractual agreement diffusing full liability for operations away from the scheme owner to the technical operator may place the technical operator in an untenable situation of being legally responsible for the day-to-day management of the linked arrangement but unable to address issues with payments across its rails.[9] As a result, organizations that can serve as the technical operator may choose not to do so given the potential risks resulting from the division of liabilities.

8. In cases where the scheme owner and technical operator are separate entities.
9. For example, in cases where the scheme owner controls the product roadmap and/or fee structure.

Consideration of the nuances and complexities in software management

The nuances and complexities of software management used for connecting IPSs should not be underestimated. There are several key questions to consider that may impact time to market:

- Who is developing and integrating (or localizing) the software? If a third party oversees integration, will there be a competitive process to determine a provider (with the associated commercial agreements to negotiate)?
- If the domestic IPS/scheme is integrating (or localizing) the software, does it have the capabilities to do so in-house (for example, experience with cross-border links, developing/integrating real-time systems)? If not, what capability build is required or, alternatively, is the capability outsourced?
- Is an (potentially large) integration project required, with appropriate testing, build and investment (in both time and resources)?

Open-source software raises its own set of questions that can affect adoption, scale and viability of linked arrangements:

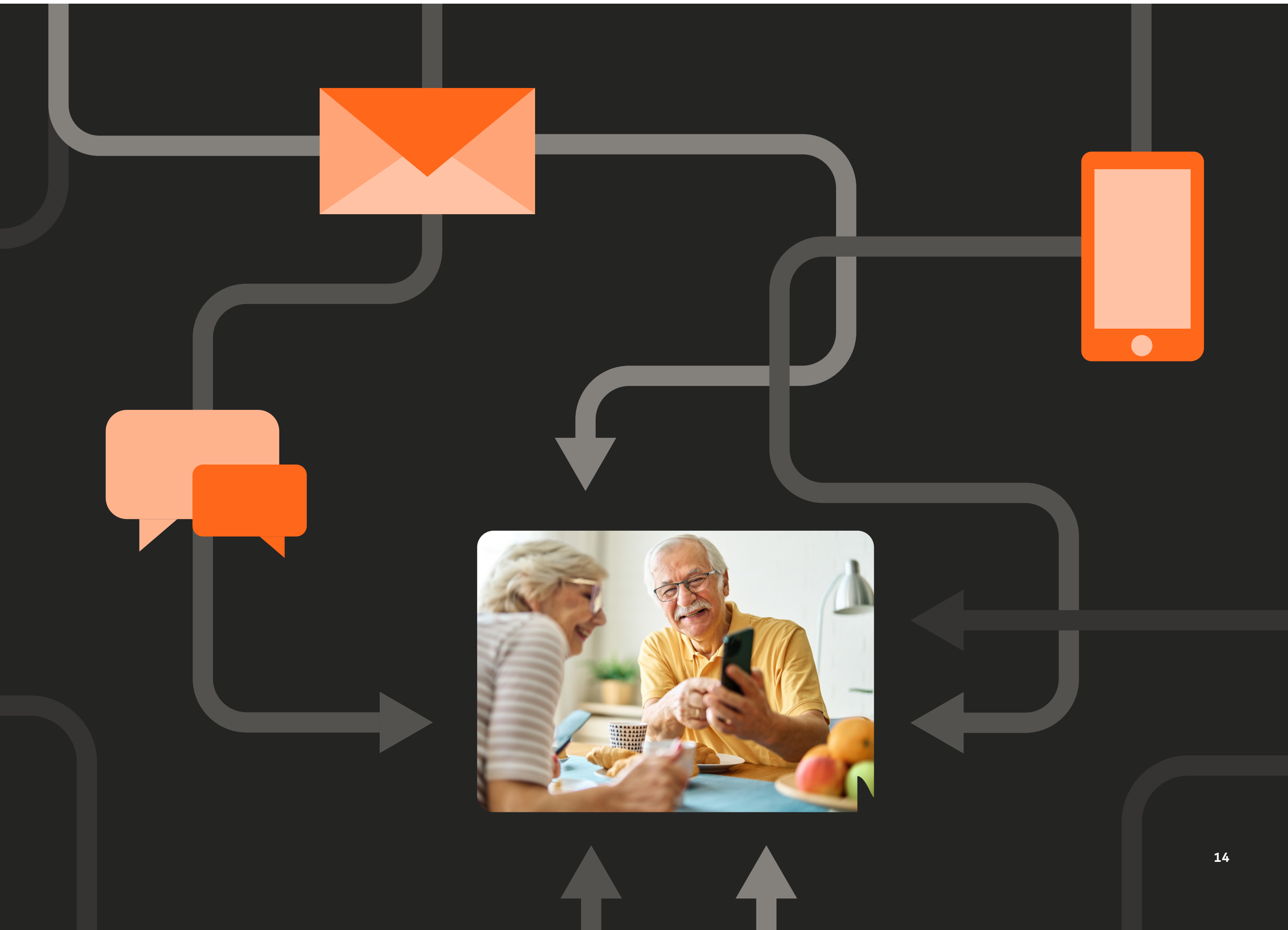
- What is the commercial relationship between the open-source software provider and other participants of the linked arrangement (for example, scheme owner, technical operator and IPS)?
- If there is a performance issue requiring immediate attention, who is liable/paying to resolve the issue?
- Is there sufficient flexibility to adapt to the regulatory and interoperability requirements (for example, messaging standards) of the local market?

Conclusion

There is no easy way to link domestic IPSs, regardless of the number of links or types of models chosen. Differences in technical, legal and regulatory frameworks, even if well understood, may be challenging to align amongst participating jurisdictions. Looking a level deeper, governance, commercial and technical models should incentivize adoption, and promote scale and viability of the linked arrangement.

Achieving this end state may require a give and take of roles and responsibilities (and thereby control) between the scheme owner, technical operator and IPSs. To arrive at models that achieve these outcomes, payment system participants should be consulted from the very start of the development process, not in the middle or near-end.

The barriers to alignment may seem high, but the foundational principles and supporting pillars outlined in this whitepaper provide a potential framework for policymakers, central banks and payment system participants to find a common path forward. Without addressing these barriers and obtaining the views of payment system participants at all phases of the development process, the potential for IPS links to support the achievement of the G20's targets for faster, cheaper, more accessible and more transparent cross-border payments may never be fully realized.



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