**Faster Payments QIAT**

Proposer: **Mobile Money Corp.**

February 21, 2017

**TABLE OF CONTENTS**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original Proposal</td>
<td>2</td>
</tr>
<tr>
<td>Q&amp;A Response</td>
<td>166</td>
</tr>
<tr>
<td>Draft QIAT Assessment</td>
<td>220</td>
</tr>
<tr>
<td>(Includes proposer comment in Appendix A &amp; B)</td>
<td>236</td>
</tr>
<tr>
<td>Task Force comments</td>
<td>244</td>
</tr>
<tr>
<td>Proposer response to Task Force comments</td>
<td>251</td>
</tr>
<tr>
<td>Final QIAT Assessment</td>
<td>253</td>
</tr>
</tbody>
</table>
Faster Payments Task Force Proposal

30 April 2016
Submitted by: Randolph Kantorowicz-Toro,
Mobile Money Corp.
CONTENTS

TABLE OF TABLES ..................................................................................................................... 4
TABLE OF FIGURES .................................................................................................................... 4
PROPOSAL TEAM ....................................................................................................................... 5
EXECUTIVE SUMMARY ............................................................................................................ 6
USE CASE COVERAGE ............................................................................................................... 9
  Feature Matrix ............................................................................................................................. 9
  Roadmap ................................................................................................................................... 10
  Supported Use Case Coverage Summary ................................................................................. 10
  Cross-border Use Case Coverage (If Applicable) .................................................................... 12
  Proposal Assumptions (Optional) ............................................................................................. 14
PART A: DETAILED END-TO-END PAYMENTS FLOW DESCRIPTION ........................... 15
  Part A, Section 1: Solution Description .................................................................................... 15
    1. MoMo Ecosystem ....................................................................................................... 16
    2. Actors in the MoMo ecosystem .................................................................................. 17
    3. Use Case Flowcharts .................................................................................................. 19
    4. Transaction State Diagram ......................................................................................... 23
    5. Integrating with Value-Added Service Providers ....................................................... 24
    6. Integrating with third parties within the scope of a MoMo transaction ..................... 25
    7. Solution Description ................................................................................................... 26
    8. Forecasted Volumes for the MoMo Ecosystem ......................................................... 29
    9. Initiation ...................................................................................................................... 30
   10. Authentication ............................................................................................................. 31
   11. Payer Authorization .................................................................................................... 33
   12. Approval by the Payer’s Provider .............................................................................. 34
   13. Clearing ...................................................................................................................... 35
   14. Receipt ........................................................................................................................ 35
   15. Settlement ................................................................................................................... 36
   16. Reconciliation .............................................................................................................. 36
  Part A, Section 2: Use Case Description .................................................................................. 38
    1. Business to Business Payments (B2B) ....................................................................... 38
    2. Business to Person Payments (B2P) ........................................................................... 40
    3. Person to Business Payments (P2B) ........................................................................... 42
    4. Person to Person Payments (P2P) ............................................................................... 45
    5. Transfer of funds between MoMo and non-MoMo accounts ..................................... 47
    6. Cross-Border Transfers ............................................................................................... 57
  Part A, Section 3: Use Case by Effectiveness Criteria ............................................................. 63
PART B: BUSINESS CONSIDERATIONS ............................................................................. 65
  1. Implementation Timeline ............................................................................................. 65
  2. Value Proposition and Competition ............................................................................. 69
  3. Integration Effort .......................................................................................................... 94
   1. Ubiquity .............................................................................................................................. 101
      1. Justification for U.1 Accessibility: ........................................................................... 101
      2. Justification for U.2 Usability: ............................................................................... 106
1. Justification for E.1 Enables competition: ......................................................... 113
2. Justification for E.2 Capability to enable value-added services: ...................... 115
3. Justification for E.3 Implementation timeline: .................................................. 115
4. Justification for E.4 Payment format standard ................................................... 117
5. Justification for E.5 Comprehensiveness: .......................................................... 117
6. Justification for E.6 Scalability and adaptability: .............................................. 119
7. Justification for E.7 Exceptions and investigations process: ............................ 121
8. Justification for E.8 Speed (Fast) ................................................................. 150
10. Justification for E.10 Governance .................................................................. 158
11. Justification for E.11 Appendices ................................................................... 159
Glossary .................................................................................................................. 159
Business Process List .............................................................................................. 160
**TABLE OF TABLES**

Table 1 MoMo Feature Matrix ........................................................................................................ 9  
Table 2 MoMo Feature Matrix ........................................................................................................ 9  
Table 3 Actors in the MoMo ecosystem ....................................................................................... 17  
Table 4 MoMo Ecosystem Actors ................................................................................................ 18  
Table 5 Matrix of Use Cases to Service Channels ........................................................................ 29  
Table 6 5 year forecast for mobile money operator in US ............................................................ 29  
Table 7 Headline features for National Rollout ............................................................................ 66  
Table 8 B2B Value proposition and Competition ......................................................................... 71  
Table 9 P2G, P2B Value proposition and Competition .................................................................. 75  
Table 10 P2P Value proposition and Competition ........................................................................ 80  
Table 11 G2P, B2P Value proposition and Competition .............................................................. 84  
Table 12 B2P Value proposition and Competition ....................................................................... 89  
Table 13 Commercial Integration classes and functions .............................................................. 97

**TABLE OF FIGURES**

Figure 1 Financial liquidity ensured by Federal Reserve Accounts ............................................... 8  
Figure 2 MoMo Ecosystem ........................................................................................................... 16  
Figure 3 Business to Business Payments (B2B) Flowchart .......................................................... 19  
Figure 4 Business to Person Payments (B2P) Flowchart .............................................................. 20  
Figure 5 Person to Business (P2B) Flowchart .............................................................................. 21  
Figure 6 Person to Person (P2P) Flowchart .................................................................................. 22  
Figure 7 Transaction State flow Diagram ..................................................................................... 23  
Figure 8 Value Added Services – example integrated payment collection ................................... 24  
Figure 9 Multi-stage transaction with additional contextual data collection ............................... 25  
Figure 10 MoMo sends funds to External Account held at a DI .................................................. 49  
Figure 11 MoMo receives funds from external Account via FedWire .......................................... 50  
Figure 12 MoMo Agent Float management assistance via Fed Wire .......................................... 51  
Figure 13 MoMo sends funds to External Account held at a DI via ISO RTGS ............................ 53  
Figure 14 MoMo receives funds from External Account for account holder via ISO RTGS ...... 54  
Figure 15 MoMo Agent Float management assistance via FedWire ISO RTGS ............................ 55  
Figure 16 USA Implementation timeline for MoMo Platform ..................................................... 66  
Figure 17 Key to USA Implementation timeline .......................................................................... 67  
Figure 18 Onboarding of Commercial Partners .......................................................................... 95  
Figure 19 Integration Effort Increase .......................................................................................... 96  
Figure 20 Business Customer Integration Diagram ...................................................................... 99  
Figure 21 Bank Integration Diagram ......................................................................................... 100  
Figure 22 VAS Provider Integration Diagram ............................................................................. 100
PROPOSAL TEAM

Randolph Kantorowicz
Chief Executive Officer

Warren D Carew
Chief Technology Officer

Vincent Butkiewicz
Vice President

Michael Richards
Chief Technology Architect

Oscar Cobar
Vice President Technology

Silvia Hernandez
Product Owner
EXECUTIVE SUMMARY

MoMo’s business model will provide financial services to the unbanked and underbanked American citizen, as well as other US residents, and its proof of concept is already in operation.

MoMo is designed to make it easy and attractive for people to take their first step towards Financial Inclusion.

MoMo offers the following key advantages to its account holders:

1. The Solution provides a high value result to stakeholders as well as a fee per transaction that is significantly lower than the regulatory mandated one.
2. The Solution provides a high value result to stakeholders as well as a fee per operation (transaction, clearing and cash in/out) that is significantly lower than the actual US market.
3. Instantaneous transaction (end to end) < 2 seconds.
4. Reduce the account holder’s physical mobility, measured as time to find where to cash in/out, to 10 minutes.
5. MoMo’s chain fee structure provides the ability to affordably transfer payments, as low as US$5.00 or less.
6. MoMo accounts are cash accounts. The funds of the account holders are securely deposited and reside at a Federal Reserve Bank account.

MoMo account holder services include (but are not limited to):

- Money transfers between individuals (P2P)
- Cash-In and Cash-Out services via our Agent Network (P2B)
- Recurring and non-recurring bill payments (P2B, P2G)
- Purchase of goods and services (P2B)
- Government and commercial payments to individuals for Social Welfare, Subsidies, Payrolls, etc. (G2P, B2P)
- Transfer of funds between businesses (B2B)
- e-commerce payments.

Solution Description.

-MoMo account holders download the MoMo B4P (Banking for People) Mobile Application on their mobile device.
-Funding of the new account can be completed by the MoMo account holder in the form of a physical cash payment to an agent, by a transfer from another MoMo account,
-Once the MoMo account is funded, financial services are available using options from the MoMo menu either on their mobile device or on any on-line device.
-The transfer payee is identified either from a list of authorized MoMo payees, or by their mobile device phone number. The transfer amount is entered, fees are disclosed.
-Sufficient account balance is validated and the transfer is completed in 2 seconds.
-Pre-Authorized transfers are supported and active if there is a positive balance in the personal account.
-In the case of a cross border transfer, the foreign exchange rate and the net foreign exchange transfer amount is quoted and the subscriber is given the chance to accept or decline the transaction on the quoted basis.
-Within the MoMo service, the account of the payer is immediately debited and the MoMo account of the transfer recipient in instantaneously credited (virtual money transaction).
-Both the payer’s and the recipient’s account balances are updated in real time within the MoMo service.
-A transfer within the MoMo system makes no change to the overall net balance of the system, since all elements of the transaction are double-entry. The actual funds remain within the Federal Reserve Bank (Central Bank) in the MoMo Master and or “Custodial “account, and the total balance of this account is unaffected by the transaction.
-When a transaction party is outside of the MoMo service, standard payment requests are made to move the funds between institutions, and the MoMo Master account is updated to reflect this.
-Should a MoMo account holder require cash, it can be withdrawn from their account by visiting any participating agent, or via an ATM where there is an agreement between MoMo and ATM providers.
-Subscribers to the MoMo system will therefore be able to transfer money between their MoMo accounts and their accounts elsewhere in the banking system, using both manual and automated transfer methods. In both cases, a transaction will be instantiated to transfer funds between the MoMo control account and the control account of the subscriber’s financial institution, and the balance in the MoMo Master account with the Federal Reserve will be updated to reflect the money being transferred as a consequence of completion of the transaction.
-Once notification of the completion of the transaction is received by the MoMo system, the subscriber’s balance in the MoMo system will be updated to reflect the change.

MoMo will support the following mechanisms for transferring money between MoMo accounts and accounts with other financial institutions.

3. Single or bulk transaction requests can be initiated by MoMo account holders
4. Mobile and Internet based services are used by most Account holders,
5. Enrolment in the form of an Account opening Form registration is not required prior to receiving funds within the system, but to access the funds requires appropriate levels of registration.
6. Transactions that are finalised internally within the MoMo Service, as well as those that result in external funds transfers, can all be initiated using the same process.
In summary, MoMo’s proposal to the Faster Payment Task Force is to:

1. Facilitate and encourage the financial inclusion of the unbanked and underbanked population of the US in the financial system, and engage them in the modern digital economy.
2. Cover all the US territory in five years, with a network of 450,000 agents.
3. Interface with the existing payments system via ISO-20022 messages, and support future interface changes.
4. Support multiple service and product providers of all classes and promote ubiquity and competition.
5. Maximise the reach of the solution by rolling it out across multiple channels and take a risk-based approach to security in each channel.
6. The service that MoMo provides is complementary to the more traditional banking services that other Financial Institutions provide.

This proposal assumes that 100% of MoMo Account holders’ funds will reside within the Federal Reserve Bank account; and that it will send and receive funds to and from other financial institutions (Settlement) already existing in the Federal Reserve Bank. MoMo’s proposal is to use this mechanism (and any equivalent mechanisms which may be adopted as a consequence of the Faster Payments Solution) to implement direct connections between subscriber bank accounts and MoMo accounts.

This is a simplification, as each account holder can have multiple accounts. The liabilities represented in the Account Holder’s accounts will be covered by the Cash held in the Control Account at the Federal Reserve.

MoMo Account Holders’ accounts are reflected within the MoMo system showing the ownerships for funds within the platform.

Within the system, the Control Accounts reflect the underlining Federal Reserve account for the system.

Figure 1 Financial liquidity ensured by Federal Reserve Accounts
## USE CASE COVERAGE

### Feature Matrix

**Table 1 MoMo Feature Matrix**

<table>
<thead>
<tr>
<th>Entities involved</th>
<th>Account holder</th>
<th>Agent</th>
<th>Business (back office)</th>
<th>Business (system)</th>
<th>Business</th>
<th>Master and Custodial</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bank Integration</strong></td>
<td>B2B</td>
<td></td>
<td>D</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ETF Request</strong></td>
<td>B2B</td>
<td></td>
<td>C</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Person to Person</strong></td>
<td>P2P</td>
<td>D/C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Account holder Cash In</strong></td>
<td>P2B</td>
<td>C</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Account holder Cash Out</strong></td>
<td>B2P</td>
<td></td>
<td>D</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Business Cash In</strong></td>
<td>B2B</td>
<td></td>
<td>D</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Business Cash Out</strong></td>
<td>B2B</td>
<td></td>
<td>C</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Bulk Payments</strong></td>
<td>B2P, G2P</td>
<td>C</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>On Line Payments</strong></td>
<td>P2B, P2G</td>
<td>D</td>
<td>C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pay Services</strong></td>
<td>B2P, G2P</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pay Small Trader</strong></td>
<td>P2B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 2 MoMo Feature Matrix**

**Use Cases**

- Bank integration transactions against the Control Account
- ETF Request
- Person to Person (P2P)
- P2P registered Account holder
- P2P unregistered Account holder
- P2P cross border
- Account holder Cash In
- Account holder Cash Out
  Cash out not charged where cash received from:
  - From Received P2P
  - From Bulk Payment
  - From Voucher Bulk Payment
- Cash out charged
- Business Cash In (B2B)
- Business Cash Out (B2B)
Use Cases

Bulk Payments (B2P/G2P)
- Pay Registered Account holder
- Pay Unregistered Account holder
- Voucher notification
- Reference Number Validation

Pay Services (P2B) MoMo account holder services include (but are not limited to):
- Money transfers between individuals (P2P)
- Cash-In and Cash-Out services via an Agent Network (P2B)
- Personal recurring or non-recurring Bills payments (P2B, P2G) or purchase goods and services (P2B)
- Government or commercial recurring or non-recurring payments to individuals such as Social Welfare, Subsidy or Payroll payments (G2P, B2P)
- Businesses that make or receive payments to/from other businesses (B2B)

Over the Counter (OTC) bill payment at Agents

Pay Small Trader (P2B)

On Line Payments (P2B)

ROADMAP

The following use cases are currently on the roadmap for incorporation in the MoMo solution, and are expected to be included by the time the product is rolled out in the USA:

- Loyalty Services
- Offline Services, such as Logistics and Remote Payment Collection
- Disbursements / Entitlement Distribution
- Fast Payments integration
- Barcodes for payments in Store
- Forex Channels

SUPPORTED USE CASE COVERAGE SUMMARY

In the table below, identify (by entering a “Y” or an “N”) which use cases the solution intends to support for payments within the United States and a description of the specific type of payments the solution supports (example provided in the table below). Also indicate for each use case whether the solution offers cross-border functionality. Blanks will be assumed as “N”.

<table>
<thead>
<tr>
<th>Use Case</th>
<th>Description</th>
<th>Cross-Border Functionality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loyalty Services</td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Offline Services</td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Disbursements / Entitlement Distribution</td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Fast Payments integration</td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Barcodes for payments in Store</td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Forex Channels</td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Use case</td>
<td>Supported (Y/N)</td>
<td>Crossborder (Y/N)</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Business to Business (B2B)</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Business to Person (B2P)</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Person to Business (P2B)</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>
The system supports encashment of balances at participating agents or ATMs.

Account holders can send money to other individuals, either in the USA or abroad. Recipients do not have to be registered with the MoMo system.

Recipients of P2P transfers can elect to receive their funds in the MoMo system or in other Mobile Monet systems.

### Cross-border Use Case Coverage (If Applicable)

For those use cases supporting cross-border, provide the jurisdictions and systems with which the solution interoperates in the table below.

<table>
<thead>
<tr>
<th>Use Case</th>
<th>Non-US Corridor(s) and Systems</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business to Business (B2B)</td>
<td>N/A</td>
<td>The established relationships with FI and potential large value of these transactions mean that they are out of scope for the MoMo platform, but would be supported by standard remittance services.</td>
</tr>
<tr>
<td>Business to Person (B2P)</td>
<td>Y</td>
<td>B2P transactions are supported. The originator must have a way of transferring funds to the MoMo system: that is, they must have an account with an FI which is a participant in the FedWire service. Provided that this is the case, B2P payments can be defined in the currency in which they are to be received. In order to use this facility, originators will accept that the money to fund the payment will be transferred from their non-MoMo account to their MoMo account in time to make the bulk payment, and that any foreign exchange that needs to be made as part of this process will be made at an agreed rate obtaining at the time the transfer is made.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>---</td>
<td>------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Person to Business (P2B)</strong></td>
<td>Y</td>
<td>P2B transactions are supported. If a Account holder needs to make a payment to a business which transacts in another currency, they will be able to request a payment in that currency. If they do so, the MoMo system will display the exchange rate to be used, and the amounts to be paid in local and target currency, and the user will be able to accept or reject the transaction at that rate. The MoMo system then generates a voucher (effectively a pre-authorisation) which the creditor can present to the MoMo system. When the voucher is presented, the amount specified is credited to the creditor’s MoMo account in local currency, at the exchange rate agreed by the debtor when the transaction was confirmed.</td>
</tr>
<tr>
<td><strong>Person to Person (P2P)</strong></td>
<td>Y</td>
<td>P2P transactions are supported. If a user sends money to a user in another country, the same rules will apply as would apply in the USA, except that the choice will be made by the sender. That is to say: the sender will be asked what Mobile Money system (MMS) they want the funds to be credited to. When the sender responds, the transfer will be made to the selected MMS account in the MoMo system, and a request sent to the recipient MMS to complete the transfer on their side.</td>
</tr>
</tbody>
</table>
PROPOSAL ASSUMPTIONS (OPTIONAL)

It is assumed that the Federal Reserve Bank may authorize the MoMo Entity to maintain one or more Federal Reserve Bank accounts (i.e. Master, Settlement, Custodial etc.) for the purposes described in this submission. Alternatively, the MoMo Entity may be an existing or newly chartered depository institution as defined in Section 19 of the Federal Reserve Act (12 USC 461) for which the Federal Reserve Bank is authorized under existing law (see e.g., 12 USC 342) to maintain accounts. Alternatively, the MoMo Entity may be a state licensed money transmitter. We understand that Federal Reserve Bank is not currently authorized to maintain accounts for state licensed money transmitters.

Finally, the MoMo Entity may be a new entity established by new federal legislation to enable the MoMo system. It is assumed that this enabling federal legislation would authorize the Federal Reserve Bank to maintain one or more Federal Reserve Bank accounts for this MoMo Entity for the purposes described in this submission.
PART A: DETAILED END-TO-END PAYMENTS FLOW DESCRIPTION

PART A, SECTION 1: SOLUTION DESCRIPTION
1. MoMo Ecosystem

The following diagram gives a general overview of the MoMo ecosystem and the principal actors in it.

Figure 2 MoMo Ecosystem
## 2. Actors in the MoMo ecosystem

Table 3: Actors in the MoMo ecosystem

<table>
<thead>
<tr>
<th>Actors</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Account holders</td>
<td>Individuals who have accounts in the MoMo system.</td>
</tr>
<tr>
<td>Agents</td>
<td>Businesses which offer registration facilities to MoMo account holders, cash-in and cash-out services, as well as other services in the MoMo ecosystem.</td>
</tr>
<tr>
<td>Merchants and Utilities</td>
<td>Businesses which do not offer registration services to MoMo account holders, but do offer other services in the MoMo ecosystem.</td>
</tr>
<tr>
<td>Government and NGOs</td>
<td>Non-profit organisations which offer services to account holders and/or commercial actors (Agents, Merchants and Utilities) in the MoMo ecosystem.</td>
</tr>
<tr>
<td>Subscribers</td>
<td>A term covering any individual or business which has an account in the MoMo ecosystem. This includes Account holders, Agents, Merchants, Utilities, Government Agencies and NGOs.</td>
</tr>
<tr>
<td>DI Banks (and other FI)</td>
<td>Depository Institutions, Non-Bank account providers, other Financial institutions</td>
</tr>
<tr>
<td>Financial Services</td>
<td>Non-transactional financial products</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Technical services and infrastructure upon which the Service depends</td>
</tr>
<tr>
<td>Mobile Network Operators (MNO)</td>
<td>Businesses which offer SMS and data services to mobile handset owners, and which manage the assignment of MSISDNs to those handsets. The solution is not tied to any particular MNO, but uses commercial services through a gateway or directly depending on the agreements.</td>
</tr>
<tr>
<td>IP Communication Providers</td>
<td>Organisations which support connections between handsets and central MoMo services via IP</td>
</tr>
<tr>
<td>Cloud Service Providers</td>
<td>Organisations which provide compliant processing and data persistence services via IP connections.</td>
</tr>
<tr>
<td>-------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Datacentre hosting providers</td>
<td>Organisations which provide access to hypothecated or shared computing resources via IP connections.</td>
</tr>
<tr>
<td>Compliance and Governance</td>
<td>Bodies providing oversight and regulatory frameworks</td>
</tr>
<tr>
<td>AFC</td>
<td>Anti-Financial Crime</td>
</tr>
<tr>
<td>AML</td>
<td>Anti-Money Laundering. Organisations tasked with ensuring that criminals and terrorists are prevented from using financial institutions.</td>
</tr>
<tr>
<td>CFT</td>
<td>Countering Financing of Terrorism</td>
</tr>
<tr>
<td>GSMA / CGAP / IFC</td>
<td>Standards bodies which define good practice in the Mobile Money and Financial Inclusion space</td>
</tr>
</tbody>
</table>

*Table 4 MoMo Ecosystem Actors*
3. Use Case Flowcharts

Figure 3: Business to Business Payments (B2B) Flowchart
Figure 4 Business to Person Payments (B2P) Flowchart
Figure 5: Person to Business (P2B) Flowchart
Figure 6 Person to Person (P2P) Flowchart
MoMo Accounts deliver real-time transaction processing to its users. This requires that once funds are available, that the transaction is irrevocable and then user can distribute the funds immediately. Being a cash based platform, this is achieved in the majority of transactions.

However, in a sophisticated financial services market, there are times when the user needs to confirm the transaction (e.g. when extra-ordinary charges are to applied or additional details are required) or a 3rd party on behalf of which a service is being offered needs to verify the request before completing the transaction.

For these reasons, the MoMo transaction state flow supports multi-stage transactions where multiple individuals or systems are required to finalise a transaction.

This means that additional contextual data, verifications or confirmations of 3rd party business rules are completed before funds are cleared internally for use.
5. Integrating with Value-Added Service Providers

![Diagram showing the integration process]

Figure 8 Value Added Services – example integrated payment collection
6. Integrating with third parties within the scope of a MoMo transaction

Figure 9 Multi-stage transaction with additional contextual data collection
7. Solution Description

MoMo accounts are cash accounts. The account holding the funds for the account holders will be securely deposited and will reside at the Federal Reserve Bank.

MoMo account holders download the MoMo B4P (Banking for People) Mobile Application on their mobile device. The application supports multiple languages and can be downloaded to any smart or feature phone.

Funding of the new account can be completed by the MoMo account holder in the form of a physical cash payment to an agent, by a transfer from another MoMo account,

Once the MoMo account is funded, financial services are available using options from the MoMo menu either on their mobile device or on any on-line device. The transfer payee is identified either from a list of authorized MoMo payees, or by their mobile device phone number. The transfer amount is entered, fees are disclosed (standard fees are also listed online and are available from an agent or Account Holder service representative), sufficient account balance is validated and the transfer is completed in a maximum of 2 seconds. Pre-Authorized transfers are supported and active if there is a positive balance in the personal account.

In the case of a cross border transfer, the foreign exchange rate and the net foreign exchange transfer amount are quoted and the subscriber is given the chance to accept or decline the transaction on the quoted basis.

Within the MoMo service, the account of the payer is immediately debited and the MoMo account of the transfer recipient in instantaneously credited (virtual money transaction). Both the payer’s and the recipient’s account balances are updated in real time within the MoMo service. A transfer within the MoMo system makes no change to the overall net balance of the system, since all elements of the transaction are double-entry. The actual funds remain within the Federal Reserve Bank (Central Bank) in the MoMo Master and or “Custodial “account, and the total balance of this account is unaffected by the transaction. When a transaction party is outside of the MoMo service, standard payment requests are made to move the funds between institutions, and the MoMo Master account is updated to reflect this.

MoMo’s fee chain cost structure is also compelling across all targeted use cases. While MoMo’s fees are consistently low, this benefit is critical to the low income unbanked and underbanked segments of the population and a new income generated toll for the network of “agents” (branches) MoMo’s chain fee structure provides the ability to affordably transfer payments as low as under US$5.00.

Should a MoMo account holder require cash, it can be withdrawn from their account by visiting any participating agent, or via an ATM where there is an agreement between MoMo and ATM providers.
MoMo provides a simple, web-based way for businesses to sign up with the MoMo system so that they can serve their existing account holders who are also MoMo account holders.

This proposal assumes that the MoMo control account will be directly backed by an account with the Federal Reserve, and that this account will be usable to transfer money between the MoMo system and the accounts held with the Federal Reserve by other financial institutions. The MoMo proposal is to use this mechanism (and any equivalent mechanisms which may be adopted as a consequence of the Faster Payments Solution) to implement direct connections between subscriber bank accounts and MoMo accounts.

Subscribers to the MoMo system will therefore be able to transfer money between their MoMo accounts and their accounts elsewhere in the banking system, using both manual and automated transfer methods. In both cases, a transaction will be instantiated to transfer funds between the MoMo control account and the control account of the subscriber’s financial institution, and the balance in the MoMo Master account with the Federal Reserve will be updated to reflect the money being transferred as a consequence of completion of the transaction. Once notification of the completion of the transaction is received by the MoMo system, the subscriber’s balance in the MoMo system will be updated to reflect the change. This transaction will use the FedWire service initially, and will be updated to make use of faster and more efficient transfer services as these become available. This process is described in more detail in the sections below.

MoMo will support the following mechanisms for transferring money between MoMo accounts and accounts with other financial institutions.

1. Manual transfers. A MoMo subscriber can generate a transaction to transfer money into or out of their MoMo accounts from other financial systems.
2. Net balance transfers. A MoMo subscriber will be able to set up a rule within the system which transfers a specified amount of money out of the MoMo account into a specified account (either inside or outside the MoMo system) when the account’s balance goes above a trigger level, or transfers a specified amount of money into the MoMo account (again, either inside or outside the MoMo system) when the balance of the account falls below a trigger level. The MoMo system will allow subscribers to define and view these definitions via all available channels.

A summary of the key functional areas provided by the MoMo ecosystem is given below:

1. Single or bulk transaction requests can be initiated by MoMo account holders with appropriate authority to initiate payments over any channels that their account has been approved to use.
2. Mobile and Internet based services are used by most Account holders, while Commercial organisations have additional interfaces, including an Administration Website through which they can manage their account and request transactions, to various APIs.
3. Enrolment in the form of an Account opening Form registration is not required prior to receiving funds within the system, but to access the funds requires appropriate levels of registration. So, for instance, a subscriber can send money to anyone, whether or not they are registered on the system; but the recipient must register in order to make any use of those funds.

4. Transactions that are finalised internally within the MoMo Service, as well as those that result in external funds transfers, can all be initiated using the same process.

5. To ensure that business and compliance rules are enforced, requests are explicitly classed as particular transaction types.

6. Transaction types have configurable contextual data requirements. For example, user registration requires some amount of information about the applicant to be captured. A simple balance request, on the other hand, only requires security information.

7. Because most transactions take place within the MoMo Ecosystem, contextual data relating to them can be recovered as required. It does not need to be stored with the transaction. For transactions which involve interactions between the Solution and Providers, on the other hand, contextual information will be included with each element of the transaction conversation.

8. All parties involved in transaction initiation are recorded for security analysis. This includes MoMo Agent organisations, MoMo Agent assistants and the POS device instance used.

9. A matrix of Services to Services channels is provided below:

<table>
<thead>
<tr>
<th>Service Channel</th>
<th>Admin Website</th>
<th>Android</th>
<th>IOS</th>
<th>MIDlet</th>
<th>Bank API</th>
<th>API</th>
<th>External Services</th>
<th>SMS</th>
<th>WebPos</th>
<th>API</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bank integration</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ETF Request</strong></td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Person to Person</strong></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>User Cash In</strong></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>User Cash Out</strong></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Bulk Payments</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td><strong>On Line Payments</strong></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
8. Forecasted Volumes for the MoMo Ecosystem

According to the FDIC, the US economy generates in excess of 10 billion payment transactions per month across the four use cases. The MoMo forecast below is conservatively predicated on the expectations of market penetration that a single mobile money operator in a multi-operator market could expect to reach over a 5-year period. The model is based on removing a single transaction per target payee/payer from the current payment systems and introducing mobile money service transactions as seen developed in other successful mobile money markets. For the initial model, this is in the order of 4 transactions per month per user, in 2015 the GSMA is reporting 11.5 transactions per user per month on mobile money platforms around the world.

Table 6 5 year forecast for mobile money operator in US

<table>
<thead>
<tr>
<th>Domestic</th>
<th>Revenue Txns</th>
<th>Information &amp; Management Txns</th>
<th>Total Transaction Volume per Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y1 Q4</td>
<td>Y2 Q1</td>
<td>Y2 Q2</td>
<td>Y2 Q3</td>
</tr>
<tr>
<td>0.04</td>
<td>0.09</td>
<td>0.38</td>
<td>14.88</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 Q1</td>
<td>Y3 Q2</td>
<td>Y3 Q3</td>
</tr>
<tr>
<td>0.05</td>
<td>0.10</td>
<td>0.46</td>
<td>16.93</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>789.79</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 Q1</td>
<td>Y3 Q2</td>
<td>Y3 Q3</td>
</tr>
<tr>
<td>0.06</td>
<td>0.15</td>
<td>0.84</td>
<td>31.80</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
<td>Y3 H2**</td>
<td>Y4 H1</td>
</tr>
<tr>
<td>0.15</td>
<td>0.24</td>
<td>0.90</td>
<td>90.01</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
<td>Y3 H2**</td>
<td>Y4 H1</td>
</tr>
<tr>
<td>0.24</td>
<td>0.30</td>
<td>1.00</td>
<td>106.40</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
<td>Y3 H2**</td>
<td>Y4 H1</td>
</tr>
<tr>
<td>0.30</td>
<td>0.30</td>
<td>1.00</td>
<td>106.40</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>External</th>
<th>Revenue TPS</th>
<th>Info TPS</th>
<th>External Transactions [x1000/month]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y1 Q4</td>
<td>Y2 Q1</td>
<td>Y2 Q2</td>
<td>Y2 Q3</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 Q1</td>
<td>Y3 Q2</td>
<td>Y3 Q3</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>49</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
<td>Y3 H2**</td>
<td>Y4 H1</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
<td>Y3 H2**</td>
<td>Y4 H1</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
<td>Y3 H2**</td>
<td>Y4 H1</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
<td>Y3 H2**</td>
<td>Y4 H1</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Entities</th>
<th>Account Holders [x1,000,000]</th>
<th>Agent Stores [x1,000]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y1 Q4</td>
<td>Y2 Q1</td>
<td>Y2 Q2</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 Q1</td>
<td>Y3 Q2</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.0</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
<td>Y3 H2**</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
<td>Y3 H2**</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Infrastructure Requirements</th>
<th>Units of Compute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y1 Q4</td>
<td>Y2 Q1</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 Q1</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Y2 Q2</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 Q3</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Y2 Q4</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Y2 Q4</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Y2 Q4</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Y2 Q4</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Y2 Q4</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Y2 Q4</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Y2 Q4</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Y2 Q4</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Y2 Q4</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Y2 Q4</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Y2 Q4</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Y2 Q4</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Y2 Q4</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Y2 Q4</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Y2 Q4</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Y2 Q4</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Y2 Q4</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Y2 Q4</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Y2 Q4</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Y2 Q4</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Y2 Q4</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Y2 Q4</td>
<td>Y3 H1</td>
</tr>
</tbody>
</table>
Commercial and government agreements to make disbursements, provide payment collection and to support online commerce are drivers for the growth of the MoMo account holders. P2P, domestic and forex, will increase with the uptake of the system as the MoMo value propositions of convenience and competitive cost point are recognized by the general population. While account holders will not only be of the unbanked and underbanked community, the different user types have different expected usage requirements. The internal model reflects this by allocating different contribution of account holders to the overall numbers.

The economy of scale of mobile money solutions is highlighted by the fact that for the given number of internal transactions, there is a factor of almost a thousand less inter-bank transactions required to deliver the service to account holders.

The forecast is based upon a pilot and national rollout plan as discussed in the implementation timeline. To allow for contingency the system capacity is calculated using the assumption that the daily volume of transactions will take place within a 10hour window every day. Experience has shown that this transaction flow will occur throughout the 24hour period, but it allows for sufficient capacity to deal with peak demand. Estimates of processing capacity to deliver the solution is based upon internal “unit of compute” which is the smallest unit MoMo tests the platform against.

9. Initiation

Receiving Payments

End users can receive payments at any time. A user may be selected as the recipient by the initiator of a payment by specifying their MSISDN. If they are already registered with the system, then the money will be transferred to their MoMo account once the transaction is confirmed by the initiator and has been validated. If they are not currently registered with the system, then they will be offered the choice of receiving the money in the MoMo system or in another Mobile Money system, if they are registered with one. This process is described in more detail in the Person to Person Payments (P2P) section below.

In this case only, recipients must perform an explicit action in order to receive their funds, by specifying which account the funds are to be transferred to. If they do not respond with in specified period, then the transfer will default to setting up an Unregistered account within the MoMo system. In this case, the recipient will have to register with the MoMo system in order to receive their funds. In all other use cases, no action is required from the recipient in order to receive their funds.

Making Payments

End users can make payments at any time, provided that they are registered users of the system in good standing, and are not debarred from initiating the transaction because they are present on
AML, CFT or AFC lists. A payment is initiated by selecting the required option from the user’s menu once they have authenticated with the system by entering their PIN, either on their handset or in a browser session. Each transaction option is identified by an easily understood icon, together with a text description. In addition, users can specify the language in which the description (and any other messages which appear on their system) should be shown. Contextual help is also available, and will be shown if the user moves their mouse over the transaction type or description. Users of the system are able to make cross-border payments by selecting specific transaction types. The recipients of cross-border payments are identified by MSISDN with an international code.

**Account Selection**

The account types that are to be credited or debited as part of a transaction are configurable, and are specified as part of the transaction definition. It is also possible to specify that a user’s default account should be used as part of the transaction. These selections can be changed through configuration as required. If a specific account type is required, and a participant in the transaction does not have an account of that type, then the transaction will fail with a descriptive message to explain why.

**Contextual Data**

For transactions where all the accounts are MoMo accounts, then minimal contextual information needs to be supplied since the relationship of account holders and the nature of transaction are well understood. Typically, all relevant data is collected while making the transaction request. Multi-stage transactions, for example, when confirmation of costs are required or additional information to authorise an extra-ordinary request, Account Holders’ will be prompted for additional information via their client service channels. (See Figure 9)

For transactions which involve transferring funds between MoMo and non-MoMo accounts, contextual data to the level required by the transfer mechanism to be used (initially FedWire, subsequently ISO 20022) will be supplied.

**Confirmation**

For transactions involving the movement of funds, users will be shown the content of the transaction as they have entered it, and the charges that will be incurred by the transaction. They are given the opportunity to confirm the transaction or to cancel it. If the user elects to cancel the transaction at this stage, then no record of the transaction is saved.

Where the transaction is a cross-border one, then the user will be able to see the exchange rate being applied, and the transaction amounts in the sender’s and recipient’s currencies.

**10. Authentication**
In order to participate in MoMo’s payment eco-system, all users are required to establish a MoMo account.

The account opening procedure is simple and the potential MoMo account holder can enroll online, on their mobile device, by visiting a MoMo agent or by contacting a MoMo corporate representative in order to complete the necessary information required for MoMo to satisfy local regulatory and compliance reporting and to conduct account holder identification and verification. A unique ID and password are established which allow the account holder to access the system either online or via the account holder’s mobile device.

Once the MoMo account is established, the account holder logs into their account and this process authenticates the account. No sensitive personal, financial or transaction activity information is resident on the device or the internet account. These access points are merely engines for secure transfer instructions to be communicated to MoMo in order to initiate and conclude a transaction, and for MoMo to populate informational fields related to the account holder’s history, account balance and other pertinent information.

In each of the above end use cases, the payer is authenticated when they log in to their account. The same process applies to the payee on each transfer. The payer identifies the payee using an MSISDN or a business reference number; no knowledge of the internal identification of the payee is required.

Contextual data is embedded in these massages as appropriate.

Summary:

1. Account holders can register via Agents using POS devices (mobile handsets, web, integrated POS [P])
2. Commercial Entities register via back-office registration or online on-boarding process [P]
3. Account holder’s identity details are recorded and checked against the sanction lists in accordance with AML/KYC.
4. Where possible, identity data is captured direct from source documents such as driver licenses.
5. Where possible third party checks like Social Security Services checks can be applied (https://www.ssa.gov/cbsv/)
6. Risk-based approaches to AML allow the level of authentication and identity verification to vary with the nature and level of services an account holder can engage in. For example: 1) unless otherwise flagged by the authorities, persons on the Black list are prevented from cashing out funds from the system but can transfer them to other parties so the network is exposed. 2) An individual Account holder might self-register online for the service and therefore be able to transfer funds into and around the system from other FI sources, but again, not be able to cash-out funds until duly verified at an Agent. 3) Commercial entities using Payment API would similarly not be able to cash-out funds from the system.
11. Payer Authorization

Authorization in the MoMo system is divided into two stages. In the first stage, the system validates the request for structural correctness and to ensure that the sender is an authorised user of the Solution. In the second phase, financial authorization is performed to ensure, for instance, that the sender has the necessary funds available to complete the transaction.

Transfers can be entered by the MoMo account holder and completed 24/7/365. Information entered as part of the transaction is validated for structural correctness on the device: for instance, transaction amounts are validated to ensure that they contain positive decimal numbers and MSISDNs are checked against a regular expression to make sure that they meet the conditions for a valid MSISDN. Normally, transactions which involve money movements include a confirmation step: the sender is shown the details of the transaction, and is asked to confirm that the details are correct and the transaction should proceed. The process of confirming the transfer details on the account holder’s internet account or mobile device authorizes the transfer and it is sent to the central MoMo processing system. At this stage, “authorization” means that the system is satisfied that the request is coming from a valid user of the system and that the content of the request is structurally correct.

Once the transaction details are sent to the core system, financial authorization is carried out. This includes resolution of all the parties to the transaction to ensure that they are in good standing and authorized to fulfil the roles required of them by the transaction type, as well as confirmation that the sender has sufficient available funds to undertake the transaction (including any charges that are due,) and is not debarred from the transaction by internal system rules such as, for instance, appearance on an AML, CFT or AFC list, or a cap on the amount of money that can be sent to another individual in a single transaction.

When both these authorization steps are complete, the system can be confident that the request comes from a valid subscriber, and that the transaction is both permitted and financially legitimate.

Pre-Authorization is supported, in that transaction requests can be triggered because of business rules, but these require confirmation from the Account Holder before being permitted.

Summary:

1. Bulk Processing goes through a distinct maker / checker phase. This means that organisations can pre-load transaction requests into the system and, once the transaction requests have been validated by a second party, they will be processed at a scheduled time. These requests can be aborted at any point; pending payments would be cancelled and processed payments would stand and require resolution.

2. Regular payments from Account holders are planned, T&C initially would be as P2B: Pay Bill. This is a scheduled Push Payment – the Account holder would be sent notification to confirm the transaction.
3. Based on the relationship with organisations, they can be enabled to request a payment. This is a pre-authorised pull payment. T&Cs initially would be as per Bill Payment, again with the Account holder being asked to confirm the transaction.

4. One Time Pull payments are made with Cash-Out, Online Purchases where the Account holder provides One Time PINs/Vouchers/Tokens to authorise the Organisation/Agent/Merchant to take funds from their account.

12. Approval by the Payer’s Provider

In the MoMo system, approval by the payer’s Provider is not required except for transaction types where funds are being transferred from an external account to the MoMo system. In all other cases, approval for the transaction is equivalent to authorization for the transaction to take place, and authorization will not be successful unless sufficient good funds are available in the Account Holder’s account to cover the amounts of the transaction principal and any charges associated with it. There is therefore no delay between the two events.

Since the explicit approval of the Payer’s Provider is not required, and normal transactions take place entirely within the MoMo system, the processes that would protect the consumer in more traditional banking environments are distributed over the life of the transaction in the MoMo system. Specifically:

- Initiators of transactions are required to authenticate by logging into the system, and by re-authorising with their PIN as part of initiating any transactions which involve the movement of funds.
- The log-in screen for web-based access includes a Captcha to make sure that robot access to the system is barred.
- Messages are encrypted, and use an operation key which changes from message to message to protect against man-in-the-middle attacks.
- Incoming transaction requests are checked for duplication and duplicate messages are discarded, to guard against unintended repetition.
- Account holders are asked to confirm their transactions to guard against error.
- The MoMo application makes use of the handset’s contacts list, and will resolve MSISDNs to names where these appear in the contacts list. Alternatively, the initiator can select from the contacts list rather than enter an MSISDN.
- The MoMo application allows account holders to select from a list of businesses by name, and uses geolocation to filter these by proximity to the handset or browser.
- MoMo account holders can see their current account balance(s) at all times when they are logged on to the MoMo application, and can see a statement of their last \( n \) transactions on demand.
- MoMo user care allows account holders to contact a human operator if they have the slightest concern about the use of their account. Subject to security verification via secret words, account holders can query unrecognised, fraudulent or erroneous payments and have them reversed by the operator if the unauthorized access is agreed.
In the case of the transfer of funds from an account outside the MoMo system to an account within the MoMo system, the Provider who manages the debtor account is asked to provide approval as part of the request that is issued via the FedWire service (or such service as will replace it as part of the Faster Payments Initiative) to transfer funds from a MoMo account (in the current FedWire service, this is the FIToFICustomerDirectDebit message.) When this request is issued, the MoMo transaction will remain in an authorized state until the MoMo system receives notification that the transaction has been either successfully completed or rejected. At this point, approval by the debtor’s Provider can be inferred from the completion of the irrevocable FedWire transaction, or from the explicit rejection of the request. The time elapsed between issue of the request and completion of the FedWire transaction is not within MoMo’s control, and no comment can therefore be made on the time between approval and authorisation except to say that it is under the control of the FedWire service (or its replacement) and the SLAs relating to that service.

13. Clearing

In the MoMo system, clearing is not applicable except for transaction types where funds are being transferred between an external account and the MoMo system. After authenticating the MoMo account holder, MoMo accepts the details of the transfer, and if sufficient funds are available, the transfer is completed instantaneously and “good funds” are credited to the payee’s MoMo account and debited from the payer’s MoMo account.

Where funds are being transferred between MoMo and non-MoMo accounts, the transfer process uses a process guaranteed by the US Federal Reserve. At present, this is the FedWire service, but MoMo will interface with any new service adopted by the US Federal Reserve as part of the Faster Payments Initiative. The core process executed by the FedWire process, and which this proposal assumes will continue to be supported by any replacement service, makes an irrevocable and non-repudiable transaction between the Federal Reserve accounts of the debtor and creditor. Completion of this transaction is confirmed by a message from the FedWire service to the MoMo system. The MoMo system takes receipt of this message as confirmation that the MoMo system’s account at the Federal Reserve will be updated as a result of the transfer, and completes the transaction within the MoMo system as a result. This increments or decrements the MoMo internal Control Account, and makes a reverse movement on the Account Holder’s account. At this point, the MoMo internal Control Account and the MoMo Master account with the Federal Reserve should be synchronised with each other.

Responsibility for clearing on the other side of the transaction (the creditor account if the transfer is from the MoMO system to the external Provider, or the debtor account if the transfer is the reverse) rests with the external Provider. The MoMo system has no part in this process.

14. Receipt

Once the Account Holder logs in and has authorized and initiated a transfer, the transfer amount is automatically, and instantaneously, debited from the payer’s account and credited to the payee’s account (including contextual data if appropriate). The account balances immediately reflect the transfer.
Receipt is notified to the parties in a number of different ways:

1. The initiator of the transaction receives a message through their (configurable) notification channel stating that the transaction that they requested has either been completed or failed. The details of the transaction are shown, together with the current balance of their account(s) and any failure message. If the transaction fails because of AML, CFT or AFC issues, no reason is given.

2. The recipient of the transaction receives a message through their (configurable) notification channel. The message is also configurable, and can range from a simple message (such as is sent to the initiator) to a full-scale transaction receipt with additional contextual information.

3. Account Holders can see the current balance on their account(s) at any time when they are logged in.

4. Account holders can query the status of their transactions and see any which are being executed, but have not yet completed. This is an important feature when transactions depend for completion on actions outside the MoMo system, such as cross-border transactions.

5. Account holders who log on via the web can see an account statement page for any of their accounts. This enables them to see all transactions (including cancelled or failed transaction) which have occurred on their account, with a running balance attached.

6. Account holders can view their last $n$ completed transactions on any device where they are logged on.

End-user data is encrypted in transit and on any client devices.

15. Settlement

Within the MoMo service, the account of the payer is immediately debited and the MoMo account of the transfer recipient is instantaneously credited (since this is a virtual money transaction). Both the payer and the recipients account balances are updated real time within the MoMo service. The actual funds remain within the Federal Reserve Bank (Central Bank) in the MoMo Master Account. When a transaction party is outside of the MoMo service, standard payment requests are made to move the funds between institutions.

For transactions which are completed within the MoMo system, the transfer of funds is instantaneous. No settlement is required. Transactions which transfer funds between MoMo accounts and non-MoMo accounts make use of irrevocable and non-repudiable transactions processed by RTGS platforms (at present, using FedWire; subsequently, this will be replaced with any other system that may be adopted as part of the Faster Payments Solution.) The question of settlement is therefore not applicable to the MoMo solution.

16. Reconciliation
Transactions which require reconciliation make use of a standard automated mark-off technique. The MoMo system generates a list of the transactions registered in the MoMo system with a given entity over a given period of time. It expects to receive a list of the transactions registered in the entity’s internal system over the same period of time. An automated mark-off process in the MoMo system matches transactions against each other according to configurable criteria, and produces an output report detailing transactions that cannot be matched with each other, if any exist. If such transactions are identified, a business process defined with the partner entity will reconcile the transactions manually, and any changes that are required as a result can be entered on the MoMo system by appropriately qualified operators.

In addition, the MoMo system runs regular reconciliations between the MoMo Master account at the Federal Reserve and the MoMo Controll Account. These reconciliations ensure that the changes to the two accounts are equal and opposite to each other. Reconciliation is performed by an automated mark-off process, which removes all matching entries and presents any non-matching entries for manual reconciliation.
PART A, SECTION 2: USE CASE DESCRIPTION

The descriptions are provided initially for the use cases B2B, B2P, P2B and P2P for the case where the payment transactions are taking place within the MoMo system. This is then followed with a description of the lifecycle changes when the funds are transferred between MoMo and 3rd Party Accounts, and when funds are transferred across borders.

1. Business to Business Payments (B2B)

When a business is registered with the MoMo system, it will have one or more individuals, who are also registered with the MoMo system, associated with it. These are employees of the business, and they are authorised to undertake payments on behalf of the business. In addition, these employees may be authorised to undertake other actions related to the business, such as registering new employees or removing existing ones. The MoMo system supports a rich architecture of roles within a business, including Maker and Checker roles to provide security against the making of payments, roles which only allow transactions to be viewed, and so on.

In addition, the MoMo system allows relationships between businesses to be set up. This allows the system to express, for instance, the relationship between the head and regional offices of a retail chain like Starbucks or 7-11 with their stores, and allows money to be transferred between the branches and the head offices by employees with appropriate permissions.

Employees who are permitted to access the MoMo system may do so in one of three ways:

1. They may log on to the MoMo website. If an employee of a business logs on to the MoMo website, then they see only information relating to the business to which they belong, and only actions which they are permitted to perform.
2. They may use a handset. Individuals are permitted to log on to a handset either as an individual or as an employee. If they log on to a handset as the employee of a business, then they will only see menu items relating to actions which they are permitted to perform.
3. If the business has set up a service connection with the MoMo system, then they can use their business’ internal systems, which will communicate with the MoMo system via a service API. In this case, it is the responsibility of the business to specify which actions employees will see; but, in any case, any transactions via the API which are attempted by employees who are not permitted to perform them will be rejected by the MoMo system, and an appropriate message returned to the business’ system via the API.

Initiation

Single B2B payments can be initiated through any of the three access routes. Payments may also be grouped into bulk payment runs, so that a number of payments can be made at the same time. Bulk payments are not available to employees using handsets.
In each case, the name of the business that is to be paid, the account from which the payment is to be taken, the account type in the recipient which is to be credited, and the amount to be paid is entered into the system. In the case of single payments via the MoMo website or handset, the employee will be asked to confirm the details of the transaction before it is passed to the central MoMo system. For transactions which are initiated via the Service API, it is the responsibility of the caller to confirm the details captured before submitting the transaction.

If bulk payments are initiated via the MoMo website, an employee can download an Excel spreadsheet into which the required payments may be entered. The spreadsheet is then loaded back into the system, where checks are made on the validity of the entries. The information is then stored in the MoMo system, and the payments are executed automatically by the MoMo system at the time specified by the business’ employee when the bulk payment request was entered.

**Authentication**

Initiators of all types of transactions are authenticated at the session level. Access is by user MSISDN and PIN, together with a Captcha to ensure that access is not being requested by a machine. A message token is attached to each communication to prevent man-in-the-middle attacks, and users are required to re-authenticate after a configurable period of inactivity. Users are not required to re-authenticate in order to perform a specific transaction.

**Payer Authorization**

Three checks are carried out for B2B transactions:

1. The originator is checked to confirm that they are authorised to make payments on behalf of their business.
2. The business account is checked to ensure that it contains sufficient funds to make the payment.
3. Both parties are checked to make sure that they are not disbarred from transactions of the requested type because they appear on AML or CFT lists.

If any of these checks are failed, the transaction is declined. It is stored in the system together with information stating the reason for its rejection, so that it is available for MoMo Account user care operation. The initiator is also sent a message explaining the reason for rejection, except in the case of rejection due to AML/CFT reasons, when no reason is given.

**Approval by the Payer’s Provider**

Payments within the MoMo system are made from positive balances in the business’s MoMo account. Approval is implicit in the passing of the available funds checking and business rules being met. Funds are authorised and reserved in the debtor’s account and the transaction is then placed in a pending state. At this point, additional processing may take place for certain types of transaction if required, before the transaction is finalised and the funds transferred.
Clearing

Funds transfers which take place within the MoMo system do not require clearing. Funds are immediately transferred from the debtor account to the creditor account, and are available to the creditor immediately. Once the transaction is finalised without error, the funds are transferred and available.

Receipt

Funds which are transferred in the MoMo system are received immediately on completion of the transaction which transfers them and are available for use. Service levels and channel definitions can be used to specify how creditors are notified that a payment has been made.

Settlement

The MoMo system transfers money immediately, and no settlement is therefore required.

Reconciliation

Transfers in the MoMo system are immediate and irrevocable, and no reconciliation is therefore required.

2. Business to Person Payments (B2P)

When a business is registered with the MoMo system, it will have one or more individuals, who are also registered with the MoMo system, associated with it. These are employees of the business, and they are authorised to undertake payments on behalf of the business. In addition, these employees may be authorised to undertake other actions related to the business, such as registering new employees or removing existing ones. The MoMo system supports a rich architecture of roles within a business, including Maker and Checker roles to provide security against the making of payments, roles which only allow transactions to be viewed, and so on.

In addition, the MoMo system allows relationships between businesses to be set up. This allows the system to express, for instance, the relationship between the head and regional offices of a retail chain like Starbucks or 7-11 with their stores, and allows money to be transferred between the branches and the head offices by employees with appropriate permissions.

Employees who are permitted to access the MoMo system may do so in one of three ways:

1. They may log on to the MoMo website. If an employee of a business logs on to the MoMo website, then they see only information relating to the business to which they belong, and only actions which they are permitted to perform.
2. They may use a handset. Individuals are permitted to log on to a handset either as an individual or as an employee. If they log on to a handset as the employee of a business, then they will only see menu items relating to actions which they are permitted to perform.

3. If the business has set up a service connection with the MoMo system, then they can use their business’ internal systems, which will communicate with the MoMo system via a service API. In this case, it is the responsibility of the business to specify which actions employees will see; but, in any case, any transactions via the API which are attempted by employees who are not permitted to perform them will be rejected by the MoMo system, and an appropriate message returned to the business’ system via the API.

Initiation

Single B2P payments can be initiated through any of the three access routes. Payments may also be grouped into bulk payment runs, so that a number of payments can be made at the same time. This initiation route is not available to employees using handsets.

In each case, the MSISDN or URI of the person who is to be paid, the account from which the payment is to be taken, and the amount to be paid is entered into the system. In the case of single payments via the MoMo website or handset, the employee will be asked to confirm the details of the transaction before it is passed to the central MoMo system. For transactions which are initiated via the Service API, it is the responsibility of the caller to confirm the transaction.

If bulk payments are initiated via the MoMo website, an employee can download an Excel spreadsheet into which the required payments may be entered. The spreadsheet is then loaded back into the system, where checks are made on the validity of the entries. The information is then stored in the MoMo system, and the payments are executed automatically by the MoMo system at the time specified by the business’ employee when the bulk payment request was entered.

Authentication

Initiators of all types of transactions are authenticated at the session level. Access is by user MSISDN and PIN, together with a Captcha to ensure that access is not being requested by a machine. A message token is attached to each communication to prevent man-in-the-middle attacks, and users are required to re-authenticate after a configurable period of inactivity. Users are not required to re-authenticate in order to perform a specific transaction.

Payer Authorization

Three checks are carried out for B2P transactions:

1. The originator is checked to confirm that they are authorised to make payments on behalf of their business.

2. The business account is checked to ensure that it contains sufficient funds to make the payment.
3. Both parties are checked to make sure that they are not disbarred from transactions of the requested type because they appear on AML or CFT lists.

If any of these checks are failed, the transaction is declined. It is stored in the system together with information stating the reason for its rejection, so that it is available for MoMo Account user care operation. The initiator is also sent a message explaining the reason for rejection, except in the case of rejection due to AML/CFT reasons, when no reason is given.

Approval by the Payer’s Provider

Payments within the MoMo system are made from positive balances in the business’s MoMo account. Approval is implicit in the passing of the available funds checking and business rules being met. Funds are authorised and reserved in the debtor’s account and the transaction is then placed in a pending state. At this point, additional processing may take place for certain types of transaction if required, before the transaction is finalised and the funds transferred.

Clearing

Funds transfers which take place within the MoMo system do not require clearing. Funds are immediately transferred from the debtor account to the creditor account, and are available to the creditor immediately. Once the transaction is finalised without error, the funds are transferred and available.

Receipt

Funds which are transferred in the MoMo system are received immediately on completion of the transaction which transfers them and are available for use. Service levels and channel definitions can be used to specify how creditors are notified that a payment has been made.

Settlement

The MoMo system transfers money immediately, and no settlement is therefore required.

Reconciliation

Transfers in the MoMo system are immediate and irrevocable, and no reconciliation is therefore required.

3. Person to Business Payments (P2B)

Individuals who are permitted to access the MoMo system may do so in one of two ways:

1. They may log on to the MoMo website. If an individual logs on to the MoMo website, then they see only information relating to their own account, and only actions which they are permitted to perform.
2. They may use a handset. Individuals are permitted to log on to a handset either as an individual or as an employee. If they log on to a handset as an individual, then they will only see menu items relating to actions which they are permitted to perform.

Initiation

Single P2B payments can be initiated through either of the two access routes.

In each case, the name of the business that is to be paid and the amount to be paid is entered into the system. The individual will be asked to confirm the details of the transaction before it is passed to the central MoMo system.

As a general rule, the MoMo system only supports Push payments: that is, payments where funds are transferred from the account of the originator of the transaction. However, there are types of B2P payment supported by MoMo which require the business to make a Pull payment: that is, to initiate a transaction which moves money from the counterparty’s account to the originator’s account. For example, on-line transactions require the on-line merchant to be able to ask for funds from the purchaser’s account. Similarly, if an individual is withdrawing cash from their account or paying for goods at a business, then the actual transaction takes the form or a request from the creditor to transfer funds from the debtor’s account.

The MoMo system handles this situation by the use of pre-authorization transactions which are initiated by the debtor. The debtor will initiate one of these transactions, and will request the payment of the sum specified to the creditor. A pre-authorization transaction is created, with an identification code which can be represented on the debtor’s handset as a barcode if required. The identification code is typically given a short expiry time, to ensure that individuals do not form a false picture of their actual account position, but funds are neither taken from, nor reserved in, their account at this stage. The creditor business then initiates a transaction to request the transfer of funds from the debtor’s account, and giving the pre-authorization identification code to support the request. Provided the identification code is correctly matched with an authorization to pay the creditor the specified amount (or more than the specified amount,) and the identification code has not expired, then the transaction is allowed to proceed.

Where these situations change the flow of transactions, this is noted in the sections below.

Authentication

Initiators of all types of transactions are authenticated at the session level. Access is by user MSISDN and PIN, together with a Captcha to ensure that access is not being requested by a machine. A message token is attached to each communication to prevent man-in-the-middle attacks, and users are required to re-authenticate after a configurable period of inactivity. Users are not required to re-authenticate in order to perform a specific transaction.
Payer Authorization

Four checks are carried out for P2B transactions:

1. If the P2B transaction is a pull transaction, the authorization identification code entered by the creditor is checked to ensure:
   a. That the code is valid
   b. That the code was generated by the debtor
   c. That the code is for an amount greater than or equal to the amount requested by the creditor.
   d. That the code has not expired.
2. The originator is checked to confirm that they are authorised to use the system
3. The originator’s account, if the transaction is a Push transaction, or the debtor’s account, if the transaction is a Pull transaction, is checked to ensure that it contains sufficient funds to make the payment.
4. Both parties are checked to make sure that they are not disbarred from transactions of the requested type because they appear on AML or CFT lists.

If any of these checks are failed, the transaction is declined. It is stored in the system together with information stating the reason for its rejection, so that it is available for MoMo Account user care operations. The initiator is also sent a message explaining the reason for rejection, except in the case of rejection due to AML/CFT reasons, when no reason is given.

Approval by the Payer’s Provider

Payments within the MoMo system are made from positive balances in the individual’s MoMo account. Approval is implicit in the passing of the available funds checking and business rules being met. Funds are authorised and reserved in the debtor’s account and the transaction is then placed in a pending state. At this point, additional processing may take place for certain types of transaction if required, before the transaction is finalised and the funds transferred.

Clearing

Funds transfers which take place within the MoMo system do not require clearing. Funds are immediately transferred from the debtor account to the creditor account, and are available to the creditor immediately. Once the transaction is finalised without error, the funds are transferred and available.

Receipt

Funds which are transferred in the MoMo system are received immediately on completion of the transaction which transfers them and are available for use. Service levels and channel definitions can be used to specify how creditors are notified that a payment has been made.
Settlement

The MoMo system transfers money immediately, and no settlement is therefore required.

Reconciliation

Transfers in the MoMo system are immediate and irrevocable, and no reconciliation is therefore required.

4. Person to Person Payments (P2P)

Individuals who are permitted to access the MoMo system may do so in one of two ways:

1. They may log on to the MoMo website. If an individual logs on to the MoMo website, then they see only information relating to their own account, and only actions which they are permitted to perform.
2. They may use a handset. Individuals are permitted to log on to a handset either as an individual or as an employee. If they log on to a handset as an individual, then they will only see menu items relating to actions which they are permitted to perform.

The system provides seamless support for P2P payments to users of other Mobile Money systems. It does this in the following way:

1. When a MoMo subscriber sends funds to a person who is not a registered MoMo subscriber, the system checks to see if funds have been sent to that person before. If they have, then the system checks to see if the funds were cashed through another mobile money provider or not.
2. The MoMo system then sends a message to the recipient’s phone in the following form:
   a. If the recipient has previously cashed funds through another Mobile Money provider, then the recipient is asked whether they would like to receive their money in the MoMo system or in the system they have previously used.
   b. If the recipient has not previously cashed funds through another Mobile Money provider, then the recipient is asked whether they would like to receive their money in the MoMo system or via some other provider. The recipient may then select another provider through which to receive the money.
3. If the recipient asks to receive the money through the MoMo system, then the MoMo system will set the recipient up as a MoMo unregistered user, and will inform the recipient that they can pick their money up by registering in the MoMo system, either at a MoMo agent or online.
4. If the recipient asks to receive the money through another Mobile Money system, then the MoMo system will generate an ISO 20022 transaction to transfer the money from the MoMo system to the recipient’s account in the selected Mobile Money system.
   a. The MoMo system will mark against the recipient’s entry in the MoMo system that they have elected to receive their money in the specified Mobile Money system.
This arrangement allows recipients who subscribe to other Mobile Money systems to pick up their funds through those systems, while removing the need to resolve MSISDNs to MNOs, and then ask the MNOs whether a particular subscriber to their network is also a subscriber to a Mobile Money system, thereby opening the door to what might be called a reverse phishing attack, in which the receiving MNO always claims their subscriber as a Mobile Money subscriber and then sets the account up for them.

**Initiation**

Single P2P payments can be initiated through either of the two access routes.

In each case, the MSISDN or URI of the person who is to be paid and the amount to be paid is entered into the system. The individual will be asked to confirm the details of the transaction before it is passed to the central MoMo system.

The MoMo system allows payments to be made to any individual, whether or not they are currently registered in the MoMo system. If the recipient is not currently registered in the MoMo system, then an identity will be created for them in the MoMo system and the money will be credited to that identity’s account. The recipient will be notified of the transfer via an SMS. However, the recipient is required to register with the MoMo system within a defined period in order to get access to the money. If they do not register within this period, then the transaction is expired and a reversal transaction is created to transfer the funds back into the originator’s account.

**Authentication**

Initiators of all types of transactions are authenticated at the session level. Access is by user MSISDN and PIN, together with a Captcha to ensure that access is not being requested by a machine. A message token is attached to each communication to prevent man-in-the-middle attacks, and users are required to re-authenticate after a configurable period of inactivity. Users are not required to re-authenticate in order to perform a specific transaction.

**Payer Authorization**

Three checks are carried out for P2P transactions:

1. The originator is checked to confirm that they are authorised to use the system
2. The originator’s account is checked to ensure that it contains sufficient funds to make the payment.
3. Both parties are checked to make sure that they are not disbarred from transactions of the requested type because they appear on AML or CFT lists.

If any of these checks are failed, the transaction is declined. It is stored in the system together with information stating the reason for its rejection, so that it is available for MoMo Account user care.
operations. The initiator is also sent a message explaining the reason for rejection, except in the case of rejection due to AML/CFT reasons, when no reason is given.

**Approval by the Payer’s Provider**

Payments within the MoMo system are made from positive balances in the individual’s MoMo account. Approval is implicit in the passing of the available funds checking and business rules being met. Funds are authorised and reserved in the debtor’s account and the transaction is then placed in a pending state. At this point, additional processing may take place for certain types of transaction if required, before the transaction is finalised and the funds transferred.

**Clearing**

Funds transfers which take place within the MoMo system do not require clearing. Funds are immediately transferred from the debtor account to the creditor account, and are available to the creditor immediately. Once the transaction is finalised without error, the funds are transferred and available.

**Receipt**

Funds which are transferred in the MoMo system are received immediately on completion of the transaction which transfers them and are available for use. Service levels and channel definitions can be used to specify how creditors are notified that a payment has been made.

**Settlement**

The MoMo system transfers money immediately, and no settlement is therefore required.

**Reconciliation**

Transfers in the MoMo system are immediate and irrevocable, and no reconciliation is therefore required.

5. **Transfer of funds between MoMo and non-MoMo accounts**

As described in the previous sections, MoMo transactions for all use case types take place within the MoMo system itself. In order to provide proper support for participants in the MoMo system who also have accounts with other financial institutions, MoMo supports use cases which allow users of the system, whether government bodies, businesses or individuals, to transfer funds between their accounts in the MoMo system and their accounts elsewhere in the financial system.

If the MoMo system is implemented before a funds transfer system which is compatible with ISO 20022 is implemented, then these transactions will be supported by the existing FedWire system.
We expect, however, that this use case will move to a communication structure using ISO 20022 as soon as this is available.

In order to use this facility, a user of the MoMo system needs to define their non-MoMo accounts to the MoMo system, and MoMo provides functionality to support this. This functionality can be accessed either from the MoMo website or from a user’s handset. If the user is an employee who is setting up the account definitions for a business, then they must have permission to perform this function. In addition, a user who wishes to use this functionality to transfer funds from their FI account to their MoMo account will need to pre-authorise the MoMo system to access their account. This must be done with the Financial Institution where the accounts are held. MoMo will publish instructions for doing this, both on its website and as part of the News function it offers to handset users of its system, but the responsibility for performing the action itself necessarily lies with the MoMo subscriber. When the action is complete, the subscriber can inform the MoMo system that pull transfers are enabled.

The MoMo system supports both manual transfers and automated transfers. A manual transfer can be initiated at any time and in either direction. An automated transfer can be set up by a user in one of two ways, as follows:

1. If the balance of a specified MoMo account falls below an amount specified by the subscriber, then transfer a specified amount from another account, which may be either another MoMo account or an external account, into the specified MoMo account.
2. If the balance of a specified MoMo account falls below an amount specified by the subscriber, then transfer a specified amount from the specified MoMo account to another account, which may be either another MoMo account or an external account.

Manual and automatic transfers both work in the same way, but have different transaction types to enable subscribers readily to distinguish how the transaction was triggered in their usage statements.

To ensure the efficient use of the external interfaces which support batch requests, the multi-stage transaction support is leveraged to batch the external requests. This is a maximum volume or maximum time window batch algorithm, so that no transaction is significantly delayed but is processed within an agreed batch window. The transfer mechanism is described below, both for the FedWire protocol and for the ISO 20022 protocol.

**FedWire transfers**

Transfers from MoMo accounts to external accounts are performed by generating a CTP (Customer Transfer Plus) transaction in the FedWire service for the amount required, specifying the target account defined by the user in the MoMo transaction.

Transfers into MoMo accounts from external accounts are performed by generating a DRC (Customer or Corporate Drawdown Request) transaction in the FedWire service, specifying the amount required and the account from which the funds are to be transferred. Once this request has
been issued, the MoMo system will await receipt of a DRW (Drawdown Payment) transaction from the FedWire service. When this message is received, the transaction will be completed if the response is positive, or will be cancelled if the response is negative or the request times out. In either case, the originator will be notified using their selected communications channel.

Movement of Funds to External Accounts via FedWire (Initiated from MoMo)

External fund movements are only permitted to be sent to an entity’s own accounts. Hence the Notification from bank goes back to originator. If the Creditor Agent is not a DI, the request will be forwarded as per normal FedWire behaviour.
Funds received from External Accounts via FedWire (Initiated from external FI/DI)

In this example, a MoMo Account Holder is transferring money from their account with another FI or DI. The Payment Notification message is sent from the external system to the MoMo system, where it is picked up. The MoMo system generates an internal transaction in the MoMo system in response to the message, which debits the MoMo Control Account and credits the account holder’s target amount with the amount of the transaction. The transaction completes automatically, and notification is sent to the Account Holder using their preferred notification channel. The use cases supported therefore include: B2B [Org to own Bank Account, Org to MoMo], B2P [3rd Party Business payment to a MoMo Account of another], P2P [Person to their own Bank Account, 3rd Party Person payment to a MoMo Account of another]
MoMo Agent Float management via Direct Debit (Initiated from MoMo)

Figure 12 MoMo Agent Float management assistance via Fed Wire

In this example, as in the previous one, funds are being transferred from an external account to a MoMo account. In this case, however, the transaction is being initiated from within the MoMo system rather than the external system. For instance, agents require sufficient liquidity within the platform to support their operation for Cash-In and Out services. Alongside the manual operation of EFT requests, it is planned to provide a pre-authorised direct debit service to assist the Agent network in the management of their float. The level of float is set based on the operational characteristics of each network and the thresholds are configured by the Agent’s in the system. Figure 12 demonstrates the direct debit solution that allows the system to maintain sufficient float. There is also an automatic EFT request that will return excess float to the agents. Similar facilities can be used by businesses to support salary or dividend payments, by government agencies or NGOs to support disbursements, and by MoMo Account Holders who also have accounts elsewhere in the banking system. In the case of individuals, additional confirmation is required internally to pre-authorise the debit.
RTGS ISO 20022 Transfers

Transfers from MoMo accounts to external accounts are performed by generating an ISO 20022 FIToFICustomerCreditTransfer message to the appropriate Financial Institution. When a matching notification is received, the originator will be notified using their selected communications channel. This process is described in Section 6.1 of the ISO 20022 Message Definition Report, Part 1.

Transfers into MoMo accounts from external accounts are performed by generating an ISO 20022 FIToFICustomerDirectDebit message to the clearing institution, specifying the amount required, the account from which the funds are to be transferred and the Financial Institution where the account is held. Once this request has been issued, the MoMo system will await receipt of a matching ISO 20022 FIToFIPaymentStatusReport message from the clearing institution. When this message is received, the transaction will be completed if the response is positive, or will be cancelled if the response is negative or the request times out. In either case, the originator will be notified using their selected communications channel. This process is described in Section 6.5 of the ISO 20022 Message Definition Report, Part 1.

The following message flows are suggested behaviours for a future ISO-20022 based RTGS service that would replace FedWire in the previous discussion.
Movement of Funds to External Accounts via ISO RTGS

Figure 13 MoMo sends funds to External Account held at a DI via ISO RTGS

This diagram shows the process flow for a Deposit Institution with accounts held at the Federal Reserve. Standard forwarding would be expected for non-corresponding banks. Transaction requests are batched and submitted within a time window or a maximum batch size.
Funds received from External Accounts via ISO RTGS

This process allows multiple requests to be processed at once. MoMo Account Holders to receive funds from any external FI, including other mobile money and bank providers.
MoMo Agent Float Management via Direct Debit via ISO RTGS

As per the suggestion using the existing FedWire solution in Figure 12, this provides support for the agents by automating funds management and minimising cash requirements.

Initiation

Funds transfer will be initiated either by a subscriber to the system, using either their handset or the MoMo website, or automatically by the system. When a transaction takes place which affects the balance of an account which is being tracked by an automated transfer mechanism, the balance
will be checked against the trigger level. If the trigger level has been broken, then a transfer action will be initiated. The MoMo system records that a transfer action has been initiated, and no further transfer actions will be initiated until this flag is cleared. The flag is cleared on finalisation of the transfer transaction, either successfully or unsuccessfully. This mechanism means that unsuccessful transfers will be re-tries.

**Authentication**

Initiators of all types of transactions are authenticated at the session level. Access is by user MSISDN and PIN, together with a Captcha to ensure that access is not being requested by a machine. A message token is attached to each communication to prevent man-in-the-middle attacks, and users are required to re-authenticate after a configurable period of inactivity. Users are not required to re-authenticate in order to perform a specific transaction.

**Payer Authorization**

Three checks are carried out for funds transfer transactions:

1. The originator is checked to confirm that they are authorised to use the system, if the transfer is a manual one. Otherwise, no check is made.

2. The originator’s account is checked to ensure that it contains sufficient funds to make the payment, in the case of a transfer out of the system. In the case of a transfer into the system, no check is made.

3. The originating party is checked to make sure that they are not disbarred from transactions of the requested type because they appear on AML or CFT lists.

If any of these checks are failed, the transaction is declined. It is stored in the system together with information stating the reason for its rejection, so that it is available for MoMo Account user care operations. The initiator is also sent a message explaining the reason for rejection, except in the case of rejection due to AML/CFT reasons, when no reason is given.

**Approval by the Payer’s Provider**

For transactions which move money from a subscriber’s MoMo account to an external account, payments are made from positive balances in the subscriber’s MoMo account. Approval is implicit in the passing of the available funds checking and business rules being met. Funds are authorised and reserved in the debtor’s account and the transaction is then placed in a pending state. At this point, additional processing may take place for certain types of transaction if required, before the transaction is finalised and the funds transferred.

For transfers which move funds from an external account to a subscriber’s MoMo account, approval is required from the Financial Institution which holds the external account before the transfer can be made. The transaction therefore remains in a pending state until this approval is received.
Clearing

Funds transfers between external accounts and the MoMo system are effected using irrevocable and non-repudiable methods and therefore do not require clearing.

Receipt

For transfers into the MoMo system, once the funds are credited to the MoMo Master account with the Federal Reserve, the Control Account in the MoMo system is credited with the transferred amount, and the funds are then transferred from the Control Account in the MoMo system to the subscriber’s account in the MoMo system.

Settlement

The MoMo system transfers money between accounts using irrevocable transactions among financial institutions, and no settlement is therefore required.

Reconciliation

Transfers between the MoMo system and other financial institutions are immediate and irrevocable, and no reconciliation is therefore required.

6. Cross-Border Transfers

This section describes in outline how the MoMo system manages cross-border payments.

MoMo will adopt an internal model for the transfer of payments across borders and the management of the associated FX risks. This model needs to take account of two use cases. In the first, the MoMo system in the USA is transferring funds to a MoMo system implemented in another country. In the second, the MoMo system is transferring funds to a non-MoMo system in the destination country. The model, and its application to the two use cases described, is set out below. We use the example of a US MoMo account holder who wishes to make a US$100 payment to a relative in Colombia.

The following general characteristics apply to the MoMo cross-border model:

1. Currency conversion will take place in the originating system.
2. The MoMo system will not assume any foreign exchange risks. All currency exchanges will be fully settled at the point the transfer is made.
3. Foreign Exchange transactions will be guaranteed by a third party service. Each third party service supported by the system will maintain MoMo accounts of the following types:
   a. For each foreign currency for which the FX provider offers conversion, an account which is used to represent the purchase of a particular foreign currency in the base currency of the originating system. Balances in this account will be denominated in
the base currency of the originating system. In the example case, the account would represent Columbian pesos (COP) purchased using dollars.

b. For each foreign currency for which the FX provider offers conversion, an account which is used to represent the foreign currency purchased. Balances in this account will be denominated in the foreign currency purchased: in the example case, COP.

c. An account which is used to represent commission earned by the FX provider. This is denominated in the base currency of the originating system.

4. The originating MoMo system will maintain an internal control account for each of the currencies for which it supports cross-border transfers.

5. Each Mobile Money system which participates in cross-border transactions will have an external control account which can be directly credited by the MoMo system. This control account should not be used for other purposes.

6. Each Mobile Money system which participates in cross-border transactions will have a reliable process for transferring money from their external control account to a float account which supports cross-border transfers from the originating system.

7. Transactions which credit the external control account of a participating system are irrevocable and non-repudiable: this implies that a sending system can be confident that a credit appearing in the receiving system’s external control account will be reflected in the account in the receiving system which represents cross-border transfers from the originating system.

8. AML, CFT and AFC checks against the recipient in cross-border transactions will be the responsibility of the receiving system.

Transfers from a MoMo system to a Mobile Money system in another country use the following pattern:

1. The initiator asks to send money cross-border and specifies the amount and the destination. The amount may be specified either in the destination currency or in the originating currency. The originator may select which Mobile Money system to send the money to, in cases where MoMo supports more than one Mobile Money system in the destination country.

2. The MoMo system resolves the destination to a country, and the country to a destination currency.

3. The MoMo system contacts the selected FX provider for the target currency, and requests a binding quotation for conversion of the requested amount from the originating currency to the target currency. The quotation is to be valid for an agreed period.

4. The selected FX provider responds with a quotation.

5. The MoMo system responds to the originator to say what amount will be debited from their account in local currency, what amount will be credited to the recipient in their local currency, the exchange rate that will apply and the charges to be levied. The originator will have the chance to accept or reject the transaction at this point.

6. If the user accepts the transaction, the MoMo system will authorise the request and, if authorization succeeds, reserve the required funds on the originator’s account.

7. The MoMo system will send a request to the destination Mobile Money system requesting authorisation of the required transfer.
8. If the destination Mobile Money system declines the transfer, the transaction will be cancelled and the originator informed via their selected communications channel. The reasons will also be stored as a note against the transaction, and the user’s reserved funds will be released.

9. The MoMo system generates a send money transaction which contains the following account movements:
   a. The MoMo system generates a credit of the requested amount from the sender’s account to the FX service’s account which represents the purchase of the target currency in the local currency (see item Error! Reference source not found.).
   b. The MoMo system generates a credit from the FX service’s account which represents the float amount of the target currency (see item Error! Reference source not found.) to the account in the MoMo system which represents funds to be transferred to the destination Mobile Provider (see item Error! Reference source not found.).

10. The MoMo system generates a debit of the requested amount, converted to the local currency of the destination, to the FX service’s account which represents the float amount of the target currency (see item Error! Reference source not found.).

11. The MoMo system makes a request to the FX provider to convert the requested amount from the local currency in the originating system to the local currency of the receiving system, and to credit the results to the receiving system’s external control account (see item Error! Reference source not found.). This forms part of a new transaction, whose type is “Foreign Exchange.” This transaction generates the following account movements:
   a. A credit of the amount being transferred in the destination currency to the account in the MoMo system which represents the Control Account in the destination currency (see item Error! Reference source not found.).
   b. A debit of the amount being transferred to the same account, representing the transfer of funds to the Foreign Exchange Provider’s account which holds amounts in the destination currency (see item Error! Reference source not found.).
   c. A credit of the amount being transferred to the Foreign Exchange Provider’s account which holds amounts in the destination currency (see item Error! Reference source not found.).

12. If the FX provider declines the transaction or reports that it has failed, both the inner transaction described in item Error! Reference source not found., and the outer transaction described in item Error! Reference source not found., are cancelled (thereby rolling back the funds) and the originator informed via their selected communications channel. The reasons will also be stored as a note against the transactions, and the user’s reserved funds will be released.

13. When the FX provider reports that the destination account has been correctly credited with the funds required, inner transaction described in item Error! Reference source not found. is complete and will be finalised. This confirms within the MoMo system that the currency conversion is complete and that the funds are available. After this point, no further changes can be made to the currency conversion.

14. The MoMo system will send a request to the destination Mobile Money provider to ask them to confirm the transaction. At this point, the destination Mobile Money system should:
a. Confirm that the funds have been received in their external control account. All funds will be in destination local currency at this point.
b. Generate and complete a currency conversion transaction with the following account movements:
   i. Debit their internal control account with the amount of the funds received.
   ii. Credit the account in their system which represents transfers from the originating MoMo system with the funds transferred.

15. If the destination Mobile Money system declines the transaction or reports that it has failed, the outer transaction described in item Error! Reference source not found. is cancelled (thereby rolling back the reserved funds) and the originator informed via their selected communications channel. The reasons will also be stored as a note against the transaction, and the user’s reserved funds will be released.

16. Otherwise, the outer transaction is now complete and can be confirmed. The originator is sent a success message via their selected communications channel.

If, for any reason, a transaction which was initially accepted by the target system in step Error! Reference source not found. cannot eventually be completed, but the currency conversion was successfully completed and the funds transferred to the target system’s Control Account, this pattern will successfully represent the true state of affairs, in which the currency has been exchanged between the two systems, but the transfer between subscribers has been declined.

This pattern will allow the MoMo system to support interfaces to multiple Mobil Money systems in a variety of countries, while avoiding foreign exchange exposure and being able to offer originators alternative competitive offerings, both in destination systems and in foreign exchange providers.

MoMo will identify potential partners by market analysis, in descending order of total amount remitted from the USA. Once potential partners have been identified, MoMo will come to agreements with them and begin development of the service.

MoMo’s standard API model allows the rapid development and testing of interfaces with third parties, since it is designed around the provision of highly configurable APIs presented via RESTful interface protocols. Third parties are authenticated by certificates, and MoMo’s configurable transaction model allows SCRUM-based development techniques to be used in the collaborative development of interfaces.

The model supports rapid identification of partners, collaboration on development and testing, and seamless roll-out of cross-border services which give the maximum functionality to MoMo users who want to remit money to other countries.
Initiation

Cross-border money transfers can be initiated by a subscriber, using any channel to which they have access. The user enters the amount to be transferred and identifies the recipient by MSISDN (or from the handset’s address book if a handset is being used.) The user may elect to specify the amount either in the originating currency or in the currency of receipt.

In cases where the MoMo system supports transfers to More than one Mobile Money provider in the destination country, the user will be given the opportunity to select the provider they wish to use.

Authentication

Initiators of all types of transactions are authenticated at the session level. Access is by user MSISDN and PIN, together with a Captcha to ensure that access is not being requested by a machine. A message token is attached to each communication to prevent man-in-the-middle attacks, and users are required to re-authenticate after a configurable period of inactivity. Users are not required to re-authenticate in order to perform a specific transaction.

Payer Authorization

The following checks are carried out for cross-border transfers:

1. The originator is checked to confirm that they are authorised to use the system
2. The originator’s account is checked to ensure that it contains sufficient funds to make the payment. This check is carried out once a price for the currency conversion has been received from the Foreign Exchange service provider.
3. Both parties are checked to make sure that they are not disbarred from transactions of the requested type because they appear on AML or CFT lists. In order to check the recipient’s status, it is necessary to contact the destination Mobile Money system and ask the system to authorise the recipient.

If any of these checks are failed, the transaction is declined. It is stored in the system together with information stating the reason for its rejection, so that it is available for MoMo Account User Care operations. The initiator is also sent a message explaining the reason for rejection, except in the case of rejection due to AML/CFT reasons, when no reason is given.

Approval by the Payer’s Provider

Payments within the MoMo system are made from positive balances in the individual’s MoMo account. Approval is implicit in the passing of the available funds checking and business rules being met. Funds are authorised and reserved in the debtor’s account and the transaction is then placed in a pending state. At this point, additional processing may take place for certain types of transaction if required, before the transaction is finalised and the funds transferred.
Clearing

Funds transfers which take place within the MoMo system do not require clearing. Funds are immediately transferred from the debtor account to the creditor account, and are available to the creditor immediately. Once the transaction is finalised without error, the funds are transferred and available.

Receipt

Two transactions take place when funds are transferred across borders in the MoMo system. The first transaction covers the purchase from a Foreign Exchange provider of the funds in the target currency and their transfer to the payee system. This transaction is initiated after authentication and authorisation, and must complete before the actual funds to be transferred. In the MoMo model, it is the FX provider who guarantees transfer of the funds to the payee system. When this transaction is complete, the funds have been transferred to the recipient system’s external control account, but have not yet been transferred to the internal control account, and thence to the MoMo system’s float account in the payee system. It is the responsibility of the payee system to make this move.

The second transaction involved crediting the funds to the recipient’s account in the payee system. As with transfers within the MoMo system, funds which are transferred are received immediately on completion of the transaction which transfers them and are available for use. Service levels and channel definitions can be used to specify how creditors are notified that a payment has been made.

Settlement

The MoMo system transfers money immediately, and no settlement is therefore required.

Reconciliation

As described above, the MoMo system contains a control account which represents transfers to (and, indeed, from) an external account owned by the payee system, to which amounts in the target currency are sent by the FX provider.

The entries in this MoMo control account should match exactly the entries in the external account owned by the payee system. The MoMo system contains an automated reconciliation system which accepts entries from the source system and uses a mark-off process to remove any matching entries. Non-matching entries can be reconciled manually.
### PART A, SECTION 3: USE CASE BY EFFECTIVENESS CRITERIA

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiation</td>
<td>U.1</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>U.2</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>U.3</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>U.4</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>U.5</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>U.6</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>E.4</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>S.7</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>S.9</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Authentication</td>
<td>U.2</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>U.3</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>S.7</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>S.9</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>S.10</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Payer Authorization</td>
<td>U.2</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>U.3</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>S.2</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>S.7</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

Use case by effectiveness criteria

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S.9</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Approval by the Payer’s Provider</td>
<td>S.3</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>S.7</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>S.9</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>F.1</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>F.5</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Clearing</td>
<td>E.4</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>S.7</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>S.9</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>F.2</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>U.1</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>----------------</td>
<td>-----</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>U.2</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>U.3</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>U.6</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>S.5</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>S.7</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>S.9</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>F.3</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>F.5</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Settlement</td>
<td>S.4</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>S.7</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>S.9</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>F.4</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Reconciliation</td>
<td>U.3</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>E.7</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>S.5</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>S.6</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>S.7</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>S.9</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>
PART B: BUSINESS CONSIDERATIONS

1. Implementation Timeline

MoMo is currently operational in El Salvador. The Government and the Central Bank in El Salvador have shown a deep commitment to providing financial inclusion to their unbanked and underbanked population and have established the regulatory environment necessary for MoMo to operate in. This includes the establishment of MoMo as a member entity of the central bank. In December of 2015, a program was announced which established MoMo as the sole provider of G2P and P2G transaction services for a Salvadoran Government Sponsored Entity. Since then, two additional GSE banks have signed contracts with MoMo.

The MoMo system is fully operational in El Salvador, an agent network has been established and transactional business has begun – mainly P2P and P2B (retails good purchases, including e-Commerce and Cash in/Cash out). Implementation of the necessary electronic interconnections for the first bank are in place with further integration and additional banks expected to be completed in 2016, Q3.


Similar legislative progress has been concluded in Colombia and the first GSE contracts are expected in either Q2 or Q3 of 2016.

MoMo has developed a stand-alone platform which has functionality capable for a wide variety of end use cases and is designed to interoperate and interface with Depositary Institutions and Non-Bank Account Providers.

All end use cases and cross border capability will be supported in El Salvador including Cross border transactions.

The MoMo’s B4P platform is portable. While the products and services continue to be developed, no further specific internal development will be necessary for technical implementation of the solution the U.S. except for systems integration with participating Government, Financial Institutions and external providers, and the establishment of the correct interconnections and formats. These extensions and integrations are indicated in the timeline below.

Implementation Overview

Figure 16 gives an overview of the implementation timeline for deploying, piloting and supporting a national roll out of MoMo services over the course of a 3year period. The availability of headline features sets are indicated.
Table 7 Headline features for National Rollout

<table>
<thead>
<tr>
<th>Phase</th>
<th>Pilot Period</th>
<th>National Rollout</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Y1 Q3</td>
<td>Y2 Q1</td>
<td>Account Holders, Agents and Online Merchants CUG Disbursements</td>
</tr>
<tr>
<td>B</td>
<td>Y2 Q1</td>
<td>Y2 Q2</td>
<td>SME Disbursements: Pay Salary</td>
</tr>
<tr>
<td>C</td>
<td>Y2 Q2</td>
<td>Y2 Q2</td>
<td>Payment(Bill) Collection</td>
</tr>
<tr>
<td>D</td>
<td>Y2 Q2</td>
<td>Y2 Q3</td>
<td>Large scale disbursements</td>
</tr>
<tr>
<td>E</td>
<td>Y2 Q3</td>
<td>Y2 Q3</td>
<td>Forex Channels</td>
</tr>
</tbody>
</table>

The principle of piloting services to an introductory user based followed by a national rollout will allow the service to grow and mature in a manner that ensures high account holder satisfaction and compliance with all necessary operational and regulatory procedures. This principle will be used across the life of the service, but is particularly important during the launch period.

MoMo will identify and work with a closed user group during the initial pilot. This will be in a state where the MTL Licenses are acquired and we can work with a small section of one of the social disbursement programs.
Notes to the Implementation Schedule (Shaded areas denote the beginning and the completion of each implementation category). Some aspects of the implementation process have already begun.

**Corporate**

C-Suite Candidates are being sourced professionally. CEO and CTO are in place. Staff includes corporate as well as technical staff. Regional offices will be established and staffed in waves as the service becomes available different states. The State Money Transmitter Licensing process is under way currently. We expect the process of attaining licenses for all 50 states to take 12 months.

**Tech Deployment and Development Streams**

As noted above, the majority of technical preparation for the deployment of the MoMo product into a new market can be done with configuration changes, and does not require additional code to be written. This work can be started as soon as the regulatory framework and fee structures are agreed, and typically takes 1-2 months to complete and test, depending on the complexity of the regulatory framework.

In addition, code will need to be written to support the integration of the MoMo product with the existing FedWire service. Our outline estimates suggest a timetable of 90 days to develop and test the product; this may, however, require extension depending on the detailed test requirements and resourcing availability of the Federal Reserve itself.

We allow a further 90 days for extension of the product to provide additional facilities for launching the MoMo product in the USA. This period will run parallel to the FedWire connection product, and is not therefore expected to extend the deployment timetable.

MoMo maintains its own configuration, technical development and testing teams, and does not expect to require significant additional technical staff to make the changes proposed. MoMo uses an end-to-end rapid development process using the SCRUM methodology, has a developed and robust continuous build process and a full automated test suite integrate with the continuous build process. All these processes mean that senior MoMo staff can estimate development times with confidence.
**Agent Network/Commercial Users**

As described in the overall description of the product in Part A, Section 1, MoMo intends to implement its agent network using an aggregator model. The main targets for the agent network will be small businesses such as convenience stores, gas stations and liquor stores, and negotiations are already under way with potential aggregators in these sectors. MoMo has an existing model for training and pilot testing small businesses.

At the same time, MoMo is in discussion with larger, multi-outlet retailers with a view to bringing their outlets on board as MoMo agents.

MoMo’s commercial team is also working with on-line retailers to enable MoMo Account users to pay for on-line purchases with their MoMo funds.

MoMo’s commercial team is working with providers of foreign exchange services to set up an interface to a service. MoMo intends to minimise its exposure to foreign exchange risk by off-loading that risk to a third party, as described in Section U.5 below.

Finally, MoMo’s commercial team is analysing the US remittance market and identifying key remittance destinations where MoMo can work with in-country providers to support cross-border remittances to those countries. At the same time, MoMo is in discussion with global remittance companies to provide fall-back services for countries where there are no existing Mobile Money solutions.

The Implementation schedule will depend on the following factors and key dependencies:

1. Approval of MoMo as an e-financial institution residing in the Central Bank. Participation and cooperation by/with Depository Institutions and Non-Bank Account Providers. State licensing.
2. Systems integration and the establishment of the appropriate contextual data formats and ISO 20022 interfaces with participating Government Entities, Financial Institutions, Non-Bank account providers, and third-party service providers (e.g., non-account holding providers of technology, software, network services, processing services, mobile wallets, equipment, security services, program managers, etc.). Until such time, MT940 or similar interfaces will be used to enable the pilot to start.
3. Compliance with appropriate regulatory reporting requirements.
2. Value Proposition and Competition

MoMo offers a service that is fast, cheaper and safer than current alternative financial transactions or the mainstream banking industry. The service targets the unbanked and underbanked sector, allowing them to transact safely and at a price point that value is delivered to the account holder, by services such as P2P and Cash-In (P2B) and Cash-Out(B2P). And to the merchants and business organisations accepting payments from them (P2B examples such as Pay Bill and online purchases). This makes bill payment collection extremely easy and reliable for the informal sector. Organisations making payments (B2P) whether wages and salary, government entitlements or insurance payments, these can be made safely and efficiently to the sectors of the population that have been traditionally hard to reach. The system provides a means to deliver these service at scale making use of the internet and mobile technologies while reducing the traditional bank transactions and ensuring 100% liquidity for all funds within the system.

Along with the financial history that the system allows account holders to build, as in other markets where mobile money services have thrived, new services and products from the financial sector will be made available. This is a significant driver for financial inclusion in all under developed communities.

This service in a modern mobile based package, also allows the banked society to engage in a responsible manner with the under banked, where it because easier and more efficient to pay for casual labour and SMEs can reduce costs in payments.

Key value elements this service brings to:

1. Reduced transaction costs compared to existing services like check cashing.
2. Cost per transaction significant lower than the regulated one.
3. Total cost per operation (transaction, clearing and cash out/in) as low as a few cents.
4. Accessibility is enhanced with wide spread agent network for cash-in/out) operations
5. Instantaneous transaction (end to end) < 2 seconds.
6. Reduce the account holder’s physical mobility, measured as time to find where to cash in/out, to 10 minutes.
7. MoMo’s fee structure provides the ability to affordably transfer payments, as low as US$5.00 or less.
8. Transaction records are created for account holders that support their financial inclusion
9. Push payments means that account holders initiate or confirm all transactions

1. Commission earned from providing service
2. Increased footfall into existing brick and mortar stores

Person to Business (P2B) Organisations:
1. Reliable payment collection, no bounced cheques
2. Reduced collection costs compared to handling costs for cheques and case
3. Easier integrated solution with fewer bank payments
4. Ability to accept online payments from Account Holders with lower costs than traditional payment channels

Business to Person (B2P) Organisations:
1. Solving the last mile disbursement problem by transferring entitlements direct to the recipient’s handset.
2. Reduced costs compared to traditional payment solutions.

Business to Business (B2B) services:
1. Reducing cash and cheque handling fees.
2. Direct and immediate availability of funds.
3. Benefit from the Agent network allowing for easy access to cash-in and out operations

Systemic benefits:
1. Real-time transaction settlement means that account holders have maximum access to funds
2. Funds are completely secure because 100% of the deposits reside in the FED.
3. Speed of inter-bank clearing is maximised since intra-Fed transactions executed over FedWire are irrevocable.

The solution proposed is an extension of the established payments ecosystem to the unbanked and underbanked population. The barriers to entry are low and not limited to existing bank or mobile operator affiliation or mobile handset make. It is non-exclusive in that having an account with MoMo does not result in monthly charges which tie users in, nor does the technology preclude the user from using other service providers, be the other mobile money or banking providers. Due to the inherent identity management and audit keeping of the platform, all regulatory and AML requirements can be met, so that fraud and criminal activity can be identified and stopped.

The following sections provide a detailed analysis for across the various use cases and the various stages of transaction process.

**Business to Business (B2B)**

In the current system, businesses (both large and small) transfer money to each other in various ways.

Some payments are made “on the spot,” which may necessitate the handling of cash. Any transaction involving cash contains the possibility of theft, both from the parties to the transaction and from third parties. Alternatively, “on the spot” payments may be made with a check, which necessitates a bank account for both the payer and payee and a potential lag in available funds for the payee. If the payment is requested by an invoice, either mailed or conveyed in person, the payment delay becomes even longer and is accompanied with the potential lag time of when the payer writes the check, authorizes the direct deposit or pays in cash. Of course, the instances of the payment method depend on the size of the payment, as well as the size and sophistication of both the payers’ and payees’ businesses.
MoMo provides a solution which is simpler, faster, less prone to fraud and theft, efficient and less costly. A MoMo account is established for each business, the debtor’s account is funded, and payments can be completed within seconds without the need for cash or any other payment system. Both the payer and the payee receive a record of the transaction and a confirmation that the funds have been transferred. Fees can be scaled to transaction size.

Table 8 B2B Value proposition and Competition

<table>
<thead>
<tr>
<th>B2B: Initiation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard Solution</strong></td>
</tr>
<tr>
<td>Payer directs bank to make transfer, payer mails check, payer delivers cash</td>
</tr>
<tr>
<td><strong>MoMo Solution</strong></td>
</tr>
<tr>
<td>Payer directs MoMo to transfer payment to payee's MoMo account. In addition, Payers can specify regular payments of fixed amounts or of whole bills.</td>
</tr>
<tr>
<td><strong>MoMo Value proposition</strong></td>
</tr>
<tr>
<td>Centralized, amplified process. Payment initiated when menu choices are entered and accepted by user</td>
</tr>
<tr>
<td><strong>Cost/Speed</strong></td>
</tr>
<tr>
<td>Variable fees per transaction type and amount. Transactions take place within the MoMo system and at high speed</td>
</tr>
<tr>
<td><strong>MoMo Actors</strong></td>
</tr>
<tr>
<td>Debit Party, Credit Party</td>
</tr>
<tr>
<td><strong>Predictability</strong></td>
</tr>
<tr>
<td>Payers have immediate access to their credit balance at all times. Since transactions take place within the MoMo system, there are no interaction or settlement issues.</td>
</tr>
<tr>
<td><strong>Enables Competition</strong></td>
</tr>
</tbody>
</table>

| **Value Added Services Capability** |
| Aggregators who manage business bill payment and factoring |

<table>
<thead>
<tr>
<th>B2B: Authentication</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard Solution</strong></td>
</tr>
<tr>
<td>Payer and Payee authenticated for bank to bank transaction. For paper checks payee authenticated by internal process - name and address.</td>
</tr>
<tr>
<td><strong>MoMo Solution</strong></td>
</tr>
<tr>
<td>Payer authenticated via certificate (for API-based services, ) website login (for browser-based services) or PIN (for handset-based services.)</td>
</tr>
<tr>
<td><strong>MoMo Value proposition</strong></td>
</tr>
<tr>
<td>Payer and Payee authentication process centralized and simplified</td>
</tr>
<tr>
<td><strong>Cost/Speed</strong></td>
</tr>
<tr>
<td>Simple certificate-based authentication or authentication via PIN</td>
</tr>
<tr>
<td><strong>MoMo Actors</strong></td>
</tr>
<tr>
<td>Debit Party</td>
</tr>
<tr>
<td><strong>Predictability</strong></td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td>Simple certificate-based authentication or authentication via PIN</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Value Added Services Capability</strong></th>
<th><strong>N/A</strong></th>
</tr>
</thead>
</table>

**B2B: Payer Authorization**

**Standard Solution**

Payer must/may authorize multiple delivery payees and/or delivery mechanisms.

**MoMo Solution**

The Payer is authorised by confirmation by the MoMo system that the Payer has sufficient funds to make the payment; that no party to the transaction is prevented from participating in transactions of that type due to their presence on AML or KYC blacklists; and that the transaction does not violate any system rules.

**MoMo Value proposition**

Payer Authorization process centralized, simplified, and shortened.

**Cost/Speed**

Run-time authorisation is restricted to funds availability and KYC/AML validity of Payer

**MoMo Actors**

Debit Party

<table>
<thead>
<tr>
<th><strong>Predictability</strong></th>
<th><strong>Enables Competition</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Run-time authorisation is restricted to funds availability and KYC/AML validity of Payer</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Value Added Services Capability</strong></th>
<th><strong>N/A</strong></th>
</tr>
</thead>
</table>

**B2B: Approval by Payers Provider**

**Standard Solution**

Payers approval process

**MoMo Solution**

MoMo approval process internal

**MoMo Value proposition**

Payer Approval process centralized, simplified, and shortened.

**Cost/Speed**

N/A

**MoMo Actors**

N/A

<table>
<thead>
<tr>
<th><strong>Predictability</strong></th>
<th><strong>Enables Competition</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Value Added Services Capability</td>
<td>N/A</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----</td>
</tr>
<tr>
<td><strong>B2B: Clearing</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Standard Solution</strong></td>
<td>Traditional bank/bank clearing process</td>
</tr>
<tr>
<td><strong>MoMo Solution</strong></td>
<td>Clearing in the traditional sense is N/A. Once payee funds and instruction are in payee's account an internal transfer is conducted between payer account and the individual payee's account</td>
</tr>
<tr>
<td><strong>MoMo Value proposition</strong></td>
<td>Internal clearing process centralized and simplified</td>
</tr>
<tr>
<td><strong>Cost/Speed</strong></td>
<td>N/A</td>
</tr>
<tr>
<td><strong>MoMo Actors</strong></td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Predictability</strong></td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Enables Competition</strong></td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Value Added Services Capability</strong></td>
<td>N/A</td>
</tr>
</tbody>
</table>

| **B2B: Receipt**                |     |
| **Standard Solution**           | Traditional bank/bank process |
| **MoMo Solution**               | The Payee's MoMo account balance updated immediately with good funds, and the Payee is notified via their preferred communications channel. The Payer is notified of receipt and exceptions electronically as response to the requested transaction. |
| **MoMo Value proposition**      | Receipt of good funds instantaneous. |
| **Cost/Speed**                  | Immediate on transaction approval |
| **MoMo Actors**                 | Credit Party |
| **Predictability**              | Intra-MoMo transfer which is quick and certain |
| **Enables Competition**         |     |
| **Value Added Services Capability** | N/A |

| **B2B: Settlement**             |     |
### Person to Business Payments (P2B)

This section will discuss numerous forms of P2B transactions including Person to Government (P2G) and payment collection in the form of the “Bill Pay” service.
In the current system, people have a wide choice of methods of making transfers, such as paying bills whether they are recurring or not, and whether an invoice is sent or not. The payer can visit an appropriate commercial location and pay in cash or money order, can mail a check, or use a direct deposit from their bank account. Visits can be inconvenient, money orders add to the cost of the payment, a check and a direct deposit entail a bank account.

The payee is then faced with the collection, consolidation, recording and accounting for the various payment types.

A MoMo account is established for each government or commercial entity and the individual payers. The electricity bill payments, for example, can be paid by the individuals from their MoMo account, on their mobile device, to the MoMo account of the utility. The payments from the individuals are consolidated in the utility’s MoMo account, allowing them to make one transfer from their MoMo account to their principal Depository Institution or Non-bank account provider. Sufficient contextual data is embedded to allow the payee to feed their accounting function and reconcile the monthly billing cycle. Alternatively, the Pay Bill transaction can be set up so that the utility is notified that the individual has made a MoMo payment in settlement of their account with the utility, and can optionally delay completion until the utility has confirmed that the payment has been registered. The payer pays one low fee per transaction which in most cases will be decreased by a MoMo agent commission to the payee.

The business or government entity receives one inexpensive bulk payment from MoMo. The individual payees make a convenient, quick and free payment MoMo account holders can use the solution, in lieu of cash, checks or credit cards, to purchase goods at retail stores. No costly credit/debit card terminal, no merchant credit card fee, less cash on hand and instant payment. The users fee is scaled to allow purchases as low as under $5 and the retail outlet earns a commission on each payment.

Table 9 P2G, P2B Value proposition and Competition

<table>
<thead>
<tr>
<th>P2G, P2B</th>
<th>P2G, P2B: Initiation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard Solution</strong></td>
<td>Payer directs bank to make transfer, payer mails check, payer delivers cash</td>
</tr>
<tr>
<td><strong>MoMo Solution</strong></td>
<td>MoMo supports two models for this. In the first, the Payer directs MoMo to transfer payment to the payee's MoMo account and MoMo notifies the Payee that their account in the MoMo system has been credited and that the Payee's internal systems should be updated to reflect this. In the second, the Payer requests a voucher to pay a given sum to the Payee, and the Payee presents the voucher to the MoMo system.</td>
</tr>
</tbody>
</table>

Centralized, simplified process. Payment initiated when menu choices are entered and accepted by user
### MoMo Actors
- Debit Party, Credit Party

### Cost/Speed
The Payer pays a low fee per transaction, which is described in advance.

### Predictability
MoMo account holders can see their current balance at all times. As long as the account holder has sufficient funds in their account and passes any relevant KYC/AML checks, the transaction is guaranteed.

### Enables Competition
Supports competition between aggregators offering interfaces to multiple businesses

### Value Added Services Capability
Allows users to make payments to aggregators who offer a single interface to multiple businesses.

<table>
<thead>
<tr>
<th>P2G, P2B: Authentication</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard Solution</strong></td>
</tr>
<tr>
<td>Payer and Payee authenticated for bank to bank transaction. For paper checks payee authenticated by internal process - name and address.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MoMo Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the first case, the Payer authenticates themselves via their PIN. In the second case, the Payee identifies themselves via a certificate (for on-line voucher presentation) or via a PIN and voucher number (for voucher presentation via a handset.)</td>
</tr>
</tbody>
</table>

Payer and Payee authentication process centralized and simplified

<table>
<thead>
<tr>
<th>MoMo Actors</th>
</tr>
</thead>
</table>
- Debit Party or Credit Party

<table>
<thead>
<tr>
<th>Cost/Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard authentication via PIN.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Predictability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Account holders are shown the details of the transaction and asked to confirm before the transaction is sent for processing.</td>
</tr>
</tbody>
</table>

### Enables Competition
N/A

### Value Added Services Capability
N/A

<table>
<thead>
<tr>
<th>P2G, P2B: Payer Authorization</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard Solution</strong></td>
</tr>
<tr>
<td>Payer must/may authorize multiple delivery payees and/or delivery mechanisms.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MoMo Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Payer is authorized either by verification of the PIN entered or by verification of the voucher number entered.</td>
</tr>
</tbody>
</table>

Payer authorization completed when menu selection process is completed and accepted by payer.
Payer Authorization process centralized, simplified, and shortened.

**MoMo Actors**
Debit Party, Credit Party

**Cost/Speed**
Simplified and instantaneous

**Predictability**

**Enables Competition**
N/A

**Value Added Services Capability**
N/A

<table>
<thead>
<tr>
<th>P2G, P2B: Approval by Payers Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard Solution</strong></td>
</tr>
<tr>
<td>Payers approval process</td>
</tr>
<tr>
<td><strong>MoMo Solution</strong></td>
</tr>
<tr>
<td>The approval process verifies that funds are available from Payer account, performs AML verification for all parties, and verifies that no rules are being violated. After the verification process is completed successfully, the transaction is applied by MoMo and funds are available for the Payee</td>
</tr>
</tbody>
</table>

Payer Authorization process centralized, simplified, and shortened.

**MoMo Actors**
N/A

**Cost/Speed**
Not applicable. MoMo accounts are always kept in credit, so a transaction will either be immediately rejected because of insufficient funds, or immediately accepted.

**Predictability**

**Enables Competition**
N/A

**Value Added Services Capability**
N/A

<table>
<thead>
<tr>
<th>P2G, P2B: Clearing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard Solution</strong></td>
</tr>
<tr>
<td>Traditional bank/bank clearing process</td>
</tr>
<tr>
<td><strong>MoMo Solution</strong></td>
</tr>
</tbody>
</table>
Clearing in the traditional sense is N/A. Once payee funds and instruction are in payee's account an internal transfer is conducted between payer account and the individual payee's account.

However, it is important to payers that their payments are properly credited in the Payee's system. For payments made via the second payment model, credit in the Payee's system is the responsibility of the Payee. For payments made via the first payment model, the MoMo system will send notification to the Payee's system and (optionally) wait until confirmation is received from the Payee's system before completing the transaction.

<table>
<thead>
<tr>
<th>Internal clearing process centralized and simplified</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MoMo Actors</strong></td>
</tr>
<tr>
<td>N/A</td>
</tr>
<tr>
<td><strong>Cost/Speed</strong></td>
</tr>
<tr>
<td>Not applicable: no clearing is involved.</td>
</tr>
<tr>
<td><strong>Predictability</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Enables Competition</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
</tr>
<tr>
<td><strong>Value Added Services Capability</strong></td>
</tr>
<tr>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>P2G, P2B: Receipt</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard Solution</strong></td>
</tr>
<tr>
<td>Traditional bank/bank process</td>
</tr>
<tr>
<td><strong>MoMo Solution</strong></td>
</tr>
<tr>
<td>Payee receives funds in their MoMo account instantly.</td>
</tr>
<tr>
<td><strong>Predictability</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Enables Competition</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
</tr>
<tr>
<td><strong>Value Added Services Capability</strong></td>
</tr>
<tr>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>P2G, P2B: Settlement</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard Solution</strong></td>
</tr>
<tr>
<td>Internal MoMo Settlement and receipt are instantaneous</td>
</tr>
</tbody>
</table>
MoMo Solution

No settlement process for MoMo to MoMo transfer. If recipient wants to withdraw money from MoMo account settlement is standard bank to bank process.

MoMo settlement

MoMo Actors

N/A

Cost/Speed

Not applicable: no settlement is involved

Predictability

Enables Competition

Competition between aggregators

Value Added Services Capability

Allows users to make payments to aggregators who settle directly with multiple businesses

P2G, P2B: Reconciliation

Standard Solution

Internal bank process

MoMo Solution

Reconciliation between the MoMo system and the Payee's system is conducted via an automated mark-off system for matches and manual reconciliation where discrepancies are identified.

Simplified and faster

MoMo Actors

N/A

Cost/Speed

Not applicable: no reconciliation is involved.

Predictability

Enables Competition

Competition between aggregators

Value Added Services Capability

Allows users to make payments to aggregators who offer bespoke reconciliation services

P2B Purchases at a Store

MoMo account holders can use the solution, in lieu of cash, checks or credit cards, to purchase goods at retail stores. No costly credit/debit card terminal, no merchant credit card fee, less cash on hand and instant payment. The users fee is scaled to allow purchases as low as under $5 and the retail outlet earns a commission on each payment.
Person to Person Payments (P2P)

MoMo account holders can transfer money, mobile device to mobile device, to their friends and family (also MoMo account holders) 24/7/365 both nationally and to any country where MoMo has a presence, or a relationship with a mobile money or remittance service. Fees are scaled for transactions as low as under $5.

*Table 10 P2P Value proposition and Competition*

<table>
<thead>
<tr>
<th>P2P</th>
<th>P2P: Initiation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard Solution</strong></td>
<td>Payer authorizes bank transfer, uses various mobile provider APPs, writes a check, pays cash</td>
</tr>
<tr>
<td><strong>MoMo Solution</strong></td>
<td>Cash In/Cash out at MoMo agent or payment to internal MoMo account via mobile device menu</td>
</tr>
<tr>
<td><strong>MoMo Value proposition</strong></td>
<td>Only MoMo Account Mobile App necessary</td>
</tr>
<tr>
<td><strong>MoMo Actors</strong></td>
<td>Debit Party, Credit Party</td>
</tr>
<tr>
<td><strong>Cost/Speed</strong></td>
<td>Payer fees variable and clearly visible to Payer. Simplified and instantaneous</td>
</tr>
<tr>
<td><strong>Predictability</strong></td>
<td>High</td>
</tr>
<tr>
<td><strong>Enables Competition</strong></td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Value Added Services Capability</strong></td>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>P2P</th>
<th>P2P: Authentication</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard Solution</strong></td>
<td>Through bank or third party provider system/App.</td>
</tr>
<tr>
<td><strong>MoMo Solution</strong></td>
<td>Payer and Payee authentication process centralized and simplified</td>
</tr>
<tr>
<td><strong>MoMo Value proposition</strong></td>
<td>Only MoMo Account Mobile App necessary</td>
</tr>
<tr>
<td><strong>MoMo Actors</strong></td>
<td>Debit Party, Credit Party</td>
</tr>
<tr>
<td><strong>Cost/Speed</strong></td>
<td>Simple authentication via PIN</td>
</tr>
<tr>
<td><strong>Predictability</strong></td>
<td>High</td>
</tr>
<tr>
<td><strong>Enables Competition</strong></td>
<td></td>
</tr>
</tbody>
</table>
### P2P: Payer Authorization

**Standard Solution**
Through bank or third party provider system/App.

**MoMo Solution**
The Payer is authorized either by verification of the PIN entered or by verification of the voucher number entered.

Payer authorization completed when menu selection process is completed and accepted by payer.

**MoMo Value proposition**
Only MoMo Account Mobile App necessary

**MoMo Actors**
Debit Party, Credit Party

**Cost/Speed**
Run-time authorisation is restricted to funds availability at Payer and KYC/AML validity of parties

**Predictability**

- Enables Competition
- N/A

### P2P: Approval by Payers Provider

**Standard Solution**
Through bank or third party provider system/App.

**MoMo Solution**
MoMo approval process internal

**MoMo Value proposition**
Only MoMo Account Mobile App necessary

**MoMo Actors**

**Cost/Speed**
N/A

**Predictability**
N/A

- Enables Competition
- N/A

### P2P: Clearing
<table>
<thead>
<tr>
<th><strong>Standard Solution</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Through bank or third party provider system/App.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>MoMo Solution</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Clearing in the traditional sense is N/A. Once payee funds and instruction are in payees account an internal transfer is conducted between payer account and the individual payees account</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>MoMo Value proposition</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Only MoMo Account Mobile App necessary</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>MoMo Actors</strong></th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Cost/Speed</strong></th>
<th>N/A</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Predictability</strong></th>
<th>N/A</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Enables Competition</strong></th>
<th>N/A</th>
<th></th>
</tr>
</thead>
</table>

| **Value Added Services Capability** | N/A |  |

<table>
<thead>
<tr>
<th><strong>P2P: Receipt</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Through bank or third party provider system/App.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>MoMo Solution</strong></th>
<th>Receipt of good funds instantaneous.</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>MoMo Value proposition</strong></th>
<th>Only MoMo Account Mobile App necessary</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>MoMo Actors</strong></th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Cost/Speed</strong></th>
<th>Funds transferred are immediately available to Payee</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Predictability</strong></th>
<th>Intra-MoMo transaction which is quick and certain</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Enables Competition</strong></th>
<th>N/A</th>
<th></th>
</tr>
</thead>
</table>

| **Value Added Services Capability** | N/A |  |

<table>
<thead>
<tr>
<th><strong>P2P: Settlement</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Through bank or third party provider system/App.</td>
<td></td>
</tr>
</tbody>
</table>

| **MoMo Solution** | Internal MoMo Settlement and receipt are instantaneous |  |

| **MoMo Value proposition** |  |
### MoMo Solution

Reconciliation is conducted between Payers MoMo account and Payees MoMo account

<table>
<thead>
<tr>
<th>G2P, B2P</th>
</tr>
</thead>
</table>

In the current system, a government or commercial entity transfers bulk payments through several means. If the recipient has a financial account it can be done by direct deposit. If the recipient does not have a bank account then they need to physically collect the check, either in person or by mail, and then take the check to a check cashing facility and pay a fee to get the funds. In both cases, the payers process is costly and time consuming and in the worst case requires the recipient to pay to have their check cashed.

In the MoMo solution, this process is simplified, more efficient, more timely and cost effective.
A government or commercial entity establishes a MoMo account as do the recipients of the bulk payments. The entity makes one bank transfer of the gross amount of the payments to its MoMo account along with the contextual data necessary to direct the individual payments to the appropriate accounts within MoMo. Once the entities MoMo account has good funds, and the transactions are authorized, the individual account payments are made. Good funds are available in the payee’s accounts within seconds of the payers MoMo account authorization. MoMo reconciles the transfers and records exceptions to the payee.

The Government or corporate entity pays one small fee per transaction and the payee pays no fees. Funds are immediately available to the recipient which can then be used to pay bills, buy goods or transfer money to friends or family.

Table 11 G2P, B2P Value proposition and Competition

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard Solution</strong></td>
<td>Payer instructs bank to process payments by direct deposits for individual recipients with bank accounts. Mails or delivers paper checks to unbanked recipients. Unbanked recipients cash checks at local stores or cashing services; in both cases, charges are high and entire amount must be cashed. Other financial services such as savings accounts and short-term loans are either unavailable to people who don't already have bank accounts or are very expensive.</td>
</tr>
<tr>
<td><strong>MoMo Solution</strong></td>
<td>Payer instructs MoMo to process bulk payments from Payers MoMo account to payees' accounts. Payments can be set up in advance and executed at a specified time. Accounts may be of three types: - Payees who have MoMo accounts - Payees who have bank accounts but not MoMo accounts - Payees who have neither For payees who have MoMo accounts, the money is disbursed into those accounts and the payee informed. For payees who have bank accounts but not MoMo accounts, the payment is credited to their bank account by MoMo. For payees who have neither, the money is disbursed into an accredited representative's account and the transaction is completed on presentation of an agreed receipt (for instance, e-signature or fingerprint) to the system. Payees are identified by the payer, giving either a MSISDN (in the case of MoMo account holders,) bank details (in the case of bank account holders who are not MoMo account holders,) or representative details (for those who have neither.) Payee details are checked by the MoMo system at the point of validation, and any errors must be corrected before the batch can be processed. The process of submitting the requests, either via admin website or API, initiates the transaction bulk workflow. In addition, third parties can define new services such as savings accounts, short-term loans etc., and offer them through the MoMo interface.</td>
</tr>
</tbody>
</table>

**MoMo Actors**

Maker, DB, Credit Parties
**MoMo Value proposition**

One set of payments instructions in payers MoMo account vs. multiple bank payments and/or multiple paper check transactions.

Centralized, simplified process. Payment initiated when menu choices are entered and accepted by user or requested via API on directly on the Payee internal system

**Cost/Speed**

The Payer pays a low fee per individual transaction. The Payee pays no fee and, where these are paid to a MoMo account, the Payee can cash benefits without incurring a further fee. All transactions involving MoMo account holders and unbanked recipients complete within the MoMo system with high reliability and speed of completion.

**Predictability**

Entries are validated on submission to ensure that Payees can be resolved in the system and that all structural requirements are complete. Checks on available funds and KYC/AML are made at validation time, but must be repeated at run time.

**Enables Competition**

**Value Added Services Capability**

Payroll service providers can make use of the system. MoMo allows organisations to act on behalf of each other, so any organisation can run B2P services on behalf of another.

---

**G2P, B2P: Authentication**

<table>
<thead>
<tr>
<th>Standard Solution</th>
<th>MoMo Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payer and Payee authenticated for bank to bank transaction as per standard process. For paper checks payee authenticated by internal process - name and address.</td>
<td>Initiating parties (Maker and Checker) are authenticated through the sign-in process by presenting login credentials for the Organisation on whose behalf they will be transacting, i.e. the Payer. Payer is authenticated based on login credentials and business identifier provided transaction requests.</td>
</tr>
</tbody>
</table>

**MoMo Actors**

Maker, Checker

**MoMo Value proposition**

Payer and Payee authentication process centralized and simplified

**Cost/Speed**

Simplified and instantaneous

**Predictability**

Standard login techniques and the use of certificates ensure that authentication is reliable

**Enables Competition**

**Value Added Services Capability**

N/A

---

**G2P, B2P: Payer Authorization**
<table>
<thead>
<tr>
<th><strong>Standard Solution</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Payer must authorize multiple delivery payees and/or delivery mechanisms.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>MoMo Solution</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Payer authorization is completed when submitting the request via API or website. Initiating parties are authenticated to ensure that they are authorised to request transactions on behalf of the Payer Organisation. Authentication validated with account sign-in process.</td>
<td></td>
</tr>
</tbody>
</table>

Payer authorization completed when menu selection process is completed and accepted by payer. Initiating parties are authenticated to ensure authorised to request transactions on behalf of Payer Organisation. Authentication validated with account sign-in process.

<table>
<thead>
<tr>
<th><strong>MoMo Actors</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Checker</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>MoMo Value proposition</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Payer authorization process centralized and simplified</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Cost/Speed</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Simplified and instantaneous</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Predictability</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Run-time authorisation is restricted to funds availability and KYC/AML validity of Payees.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Enables Competition</strong></th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Value Added Services Capability</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>G2P, B2P: Approval by Payers Provider</strong></th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Standard Solution</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard financial institution process.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>MoMo Solution</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The approval process verifies that funds are available from the Payer's account, and performs KYC/AML verification for all parties and any rules that may apply. After the verification process is completed successfully, the transaction is completed by MoMo and funds are available for the Payee. The solution checks for sufficient good funds, AML and KYC compliance, and any holds or restrictions. If there are no exceptions, the transaction is approved by MoMo. If any payees are disbarred by KYC and/or AML tests at the time of payment, those payments are omitted but the payment run is not aborted.</td>
<td></td>
</tr>
</tbody>
</table>

<p>| <strong>MoMo Actors</strong> |  |</p>
<table>
<thead>
<tr>
<th><strong>MoMo Value proposition</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MoMo approval process</td>
<td>internal - transaction limits and ranges wrt Prayer and Payee, Coverage of charges, validate AML =&gt; Authorised (funds reserved)</td>
</tr>
</tbody>
</table>

**Cost/Speed**

Not applicable. MoMo accounts are always kept in credit, so a transaction will either be immediately rejected because of insufficient funds, or immediately accepted.

**Predictability**

N/A

**Enables Competition**

**Value Added Services Capability**

Float and account management services to ensure that Payers have sufficient funds to meet commitments just in time

**G2P, B2P: Clearing**

**Standard Solution**

Payers bank proceeds through standard Clearing process with payees financial institution.

**MoMo Solution**

Clearing in the traditional sense is N/A. Once payee funds and instruction are in the payer's MoMo account an internal transfer is conducted between payer account and the individual payees account. For payees who have accounts with other banks but not with MoMo, payment is executed via a direct credit to the payee's account and the payer's account is debited as soon as the payment is confirmed. For payees who have neither bank nor MoMo accounts, the money is reserved in the payer's account. In this case, the transaction is completed and funds finally debited from the payer's account either when a receipt for the payment is received or when the transaction expires.

Variant 1

Until funds cleared into Organisation account, transactions are delayed.

Variant 2

Accounts within MoMo cleared instantly, external Payee accounts clear as per bank process. Batched MoMo Account Transfer from MoMo Control account to Payees.

**MoMo Actors**

**MoMo Value proposition**

Clearing within the MoMo ecosystem is instantaneous.

Variant 1

Organisation not needing to manually prime the MoMo system for bulk request. Accelerated since Bank ->CB transfer (for DIs)

Variant 2

Accelerated due to CB -> Bank transfer

**Cost/Speed**

No clearing is required for MoMo account holders and unbanked Payees.
<table>
<thead>
<tr>
<th><strong>Predictability</strong></th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Enables Competition</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Value Added Services Capability</strong></td>
<td>N/A</td>
</tr>
</tbody>
</table>

### G2P, B2P: Receipt

**Standard Solution**
Standard financial institution process.

**MoMo Solution**
Payees' MoMo account balance is updated immediately with good funds, and the payee is notified via their preferred communications channel. Where funds are transferred to accounts in other financial institutions, it is the receiving institution's responsibility to notify the recipient, although the MoMo system sends a description of the payment to the institution. The payer is notified of receipt and exceptions electronically as response to the requested transaction.

**MoMo Actors**

#### MoMo Value proposition
Posting good funds in payees MoMo account is instantaneous.

#### Cost/Speed
Simplified and instantaneous for MoMo account holders and the unbanked. External account holders will receive payment at normal clearing speed.

#### Predictability
MoMo uses irrevocable payment requests to ensure that payment is predictably made to external account holders.

#### Enables Competition

### G2P, B2P: Settlement

**Standard Solution**
Standard financial institution process.

**MoMo Solution**
Since the funds are transferred immediate from Payer account to Payee account the settlement is instantaneous.

Internal MoMo Settlement and receipt are instantaneous

**MoMo Actors**

#### MoMo Value proposition
Posting good funds in payees MoMo account is instantaneous.
Table 12 B2P Value proposition and Competition

<table>
<thead>
<tr>
<th>Cost/Speed</th>
<th>G2P, B2P: Reconciliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>No settlement is required, except for external account holders. For these Payees, settlement will be handled by standard transfer instruments.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Predictability</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enables Competition</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Value Added Services Capability</th>
<th>N/A</th>
</tr>
</thead>
</table>

**MoMo Actors**

**MoMo Value proposition**

Reconciliation within the MoMo system is instantaneous

**Cost/Speed**

No reconciliation is required. Internal MoMo payments do not require reconciliation, and transfers to other financial institutions are non-repudiable once completed.

**Predictability**

N/A

**Enables Competition**

N/A

**Value Added Services Capability**

N/A

---

Table 12 B2P Value proposition and Competition

<table>
<thead>
<tr>
<th>B2P</th>
<th>B2P: Initiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Solution</td>
<td>Financial services such as savings accounts and short-term loans are either unavailable to people who don't already have bank accounts or are very expensive.</td>
</tr>
</tbody>
</table>

MoMo Solution
MoMo account holder requests service from service Provider. Provider evaluates requests and responds. If request is approved, funds are transferred directly into the MoMo account holder's account and are available for immediate use.

MoMo account holder makes deposits into savings accounts, or repays loan. Reminders can be sent to encourage and support good financial behaviour and to help improve credit ratings.

Service providers can improve returns or terms based on credit history within MoMo. Subscribers may set up a regular repayment schedule for loans, which will either issue a reminder, or activate their payment subject to funds availability.

**MoMo Actors**
Maker, DB, Credit Parties

**MoMo Value proposition**
Make financial services available to people who could not otherwise obtain them, in a safe environment which reduces risk for lenders while allowing individuals to build confidence and good behaviours in the banking area.

**Cost/Speed**
The Payer pays a low fee per individual transaction. The Provider can define fees which will be paid directly into their MoMo account and exposed to users of the system at transaction time. All transactions involving MoMo account holders and unbanked recipients complete within the MoMo system with high reliability and speed of completion.

**Predictability**
Entries are validated on submission to ensure that Payees can be resolved in the system and that all structural requirements are complete. Checks on available funds and KYC/AML are made at validation time, but must be repeated at run time.

**Enables Competition**
Any service provider can set up an interface to MoMo, and vary the services that they provide and the charges they levy for them.

**Value Added Services Capability**
Any financial services provider can offer a service via MoMo. New types of service are welcomed, and MoMo transactions can easily be defined to support new business models.

**B2P: Authentication**

**Standard Solution**
Applicants have to provide detailed credit histories or pay high interest rates.

**MoMo Solution**
Individual account holders authenticate via PIN. Business account holders authenticate by certificates.

**MoMo Actors**
Maker, Checker

**MoMo Value proposition**
Payer and Payee authentication process centralized and simplified

**Cost/Speed**
Simplified and instantaneous
<table>
<thead>
<tr>
<th><strong>Predictability</strong></th>
<th>Standard login techniques and the use of certificates ensure that authentication is reliable</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Enables Competition</strong></td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Value Added Services Capability</strong></td>
<td>N/A</td>
</tr>
</tbody>
</table>

**B2P: Payer Authorization**

<table>
<thead>
<tr>
<th><strong>Standard Solution</strong></th>
<th>By definition, many MoMo account holders can't reach the standard required to open a savings account or apply for a loan from a financial institution.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MoMo Solution</strong></td>
<td>Authorisation to access the service is at the discretion of the service Provider. Once the service is granted to the subscriber, standard MoMo authorisation techniques are used: a subscriber may interact with the service provided they have sufficient funds in their account to do so, if they are the Payer (e.g. to make a repayment on a loan or to put money in a savings account.)</td>
</tr>
</tbody>
</table>

**MoMo Actors**

Checker

**MoMo Value proposition**

Payer authorisation process centralized and simplified

**Cost/Speed**

Simplified and instantaneous

**Predictability**

Run-time authorisation is restricted to funds availability and KYC/AML validity of Payees.

**B2P: Approval by Payers Provider**

<table>
<thead>
<tr>
<th><strong>Standard Solution</strong></th>
<th>Standard financial institution process.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MoMo Solution</strong></td>
<td>The approval process verifies that funds are available from the Payer's account, and performs KYC/AML verification for all parties and any rules that may apply. After the verification process is completed successfully, the transaction is completed by MoMo and funds are available for the Payee</td>
</tr>
</tbody>
</table>

**MoMo Actors**

**MoMo Value proposition**
MoMo approval process internal -
transaction limits and ranges wrt Prayer and Payee, Coverage of charges, validate AML => Authorised
(funds reserved)

<table>
<thead>
<tr>
<th>Cost/Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not applicable. MoMo accounts are always kept in credit, so a transaction will either be immediately rejected because of insufficient funds, or immediately accepted.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Predictability</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Enables Competition</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Value Added Services Capability</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B2P: Clearing</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Standard Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payers bank proceeds through standard Clearing process with payees financial institution.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MoMo Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clearing in the traditional sense is N/A.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MoMo Actors</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>MoMo Value proposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clearing within the MoMo ecosystem is instantaneous.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cost/Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost/Speed</td>
</tr>
<tr>
<td>No clearing is required for MoMo account holders and unbanked Payees.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Predictability</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Enables Competition</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Value Added Services Capability</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B2P: Receipt</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Standard Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard financial institution process.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MoMo Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payees' MoMo account balance is updated immediately with good funds, and the payee is notified via their preferred communications channel.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MoMo Actors</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Credit Party</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>MoMo Value proposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posting good funds in payees MoMo account is instantaneous.</td>
</tr>
<tr>
<td>Cost/Speed</td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td>Predictability</td>
</tr>
<tr>
<td>Enables Competition</td>
</tr>
<tr>
<td>Value Added Services Capability</td>
</tr>
</tbody>
</table>

### B2P: Settlement

<table>
<thead>
<tr>
<th>Standard Solution</th>
<th>Standard financial institution process.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MoMo Solution</td>
<td>Since the funds are transferred immediate from Payer account to Payee account the settlement is instantaneous.</td>
</tr>
</tbody>
</table>

### MoMo Actors

### MoMo Value proposition

| N/A                         |                                                                 |

### Cost/Speed

<table>
<thead>
<tr>
<th>No settlement is required, except for external account holders. For these Payees, settlement will be handled by standard transfer instruments.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predictability</td>
</tr>
</tbody>
</table>

### Enables Competition

| N/A                                                                  |                                                                 |

### Value Added Services Capability

| N/A                                                                  |                                                                 |

### B2P: Reconciliation

<table>
<thead>
<tr>
<th>Reconciliation process occurs between payees bank and payers bank.</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MoMo Solution</td>
<td>Reconciliation with the service Provider's systems is performed via an automated mark-off process, and manual reconciliation of any discrepancies that may arise. The mark-off and reconciliation processes to be used are defined as part of the process of setting up the service.</td>
</tr>
</tbody>
</table>

### MoMo Actors

### MoMo Value proposition

|                                                                 |                                                                 |

---
<table>
<thead>
<tr>
<th><strong>Cost/Speed</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Reconciliations are automated where possible, and only discrepancies are checked manually.</td>
</tr>
<tr>
<td><strong>Predictability</strong></td>
</tr>
<tr>
<td>High</td>
</tr>
<tr>
<td><strong>Enables Competition</strong></td>
</tr>
<tr>
<td>N/A</td>
</tr>
<tr>
<td><strong>Value Added Services Capability</strong></td>
</tr>
<tr>
<td>N/A</td>
</tr>
</tbody>
</table>

**Enabling Competition**

The solution is flexible enough to provide value added convenience and lower cost to any new entrant, or current competition, that makes or receives payments.

3. **Integration Effort**

**Integration Process**

The integration process follows a regular workflow for commercial services such as Small Businesses, Merchants, Utilities and Disbursement Organisations and Government. By supporting an Administration Website functionality, the MoMo platform minimises the integration that is required to access some services as these are exposed through functions on the Website.
Process Steps:
1. Enrolment via website, additional documentation may be required.
2. After validating the Identity information, the accounts are created on the Sandbox environment.
3. Credentials and appropriate information is provided to establish a secure communication channel.
4. Thereafter the organisation can use or develop integration with the system. Typically using SDKs to support this.
   a. Integration is supported across a number of channels depending on the services required.
5. Once completed, they can submit their solution for acceptance testing.
6. Once granted the credentials for live system access are issued.
7. They login to activate the account and execute test production transactions to ensure service functioning as expected.
Commercial Integration Effort

The level of integration effort required will vary widely. A small trader with an entirely mobile solution who only needs to receive and manage payments will need little more than enrolment, whereas a large financial institution offering sophisticated financial products may require a multi-month project to integrate its services with the MoMo offering.

Increasing Integration Effort

The range of existing services means that organisations have the option of rapid deployment and integration using existing features and then can build up fuller integrated models improving their management and user experience as this develops.

Broadly speaking, the effort and time required for integration can be divided into three stages, as given below:

1. If the partner’s needs can be satisfied using existing facilities of the MoMo solution, then they just need to register with the system and satisfy the commercial and AML requirements. System facilities like the ability to receive and make payments, manage their accounts and set up and execute bulk payments using the MoMo bulk facilities will be immediately available to them. Partners like simple merchants and small employers should be able to use services at this level.

2. If the partner requires specialised processing facilities, but these requirements can be satisfied by configuring existing facilities of the MoMo system, then a specific API will need to be set up for the specific MoMo Account, the characteristics of the API will need to be configured, and the assembly tested and deployed. No code will need to be written in the MoMo system to accommodate interfaces of this kind. Partners like payment collectors, aggregators and organisations who want to do direct disbursements should be able to use services at this level.

3. If the partner requires specialised processing facilities, and these requirements need new actions to be developed, then the new actions will need to be developed and tested before the integration activities can be started. The modular and configurable construction of the MoMo platform means that, once these facilities have been developed once, they can be integrated into further offerings as required. This means that facilities which would initially be available only to partners at this level could later become available to partners at the level below this, and eventually could be incorporated into standard MoMo transactions which would be available to any partner. Partners such as savings, insurance and loan providers might need to use services at this level.
## Financial Institution Integration Effort

In completing this description, proposers should focus on the following Effectiveness Criteria as they relate to payment volume assumptions: U.1 (Accessibility); U.3 (Predictability); E.1 (Enables competition); E.2 (Capability to enable value-added services); E.6 (Scalability and adaptability).

There are two aspects of integrating Financial Institutions with the MoMo product. The first is when a Financial Institution wants to offer products to MoMo Account Holders through the MoMo system. The process for integrating products for these purposes is described in the previous section. For instance, if the Chase Manhattan bank decides that it wants to offer savings products to MoMo’s account holders, integration would use the route described in the Integration Process section.

The second aspect of integrating Financial Institutions with the MoMo product is the provision of facilities to support the transfer of funds between MoMo and non-MoMo accounts. This will be handled in the following way:

1. Three new transaction types will be defined and developed for the system:

### Table 13 Commercial Integration classes and functions

<table>
<thead>
<tr>
<th>Service Channel</th>
<th>Customer / Org Handset</th>
<th>WebPos</th>
<th>Payment API</th>
<th>Admin</th>
<th>Bulk Services</th>
<th>VAS Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Trader</td>
<td>Push / Manage</td>
<td>Push</td>
<td></td>
<td>Acc Mgt.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e-Commerce Payment hosted</td>
<td>Auth</td>
<td>Request</td>
<td>Acc Mgt.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>eCommerce Payment Integrated</td>
<td>Auth</td>
<td>Request</td>
<td>Acc Mgt.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Payment Collection Organizations</td>
<td>Push / Confirm</td>
<td>Acc Mgt. &amp; Recon</td>
<td></td>
<td></td>
<td>Real-time transaction notification</td>
<td></td>
</tr>
<tr>
<td>Disbursement Organisations</td>
<td>Access entitlement</td>
<td>Acc Mgt. , Bulk request &amp; Recon</td>
<td></td>
<td>Bulk requests &amp; Recon</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
a. Transfer funds from MoMo account to customer account. This type will be used to send funds from an MoMo account holder’s MoMo account to another account. Where an account holder has more than one account, they will be able to select which account to credit. This transaction type will be initiated from within MoMo in the same way as other transaction types. It will reserve funds in the initiator’s account, and send a transfer funds request to FedWire. When FedWire responds to confirm that the transaction has completed, then the MoMo transaction will also complete and will transfer the funds from the initiator’s account to the MoMo internal control account.

b. Transfer funds from a user’s FI account to MoMo account (push). This transaction type will be used to respond to transfers of funds from an external account to a MoMo account holder’s MoMo account, where the transfer has been executed in the external banking system. A MoMo service will monitor for messages from FedWire. When a message is picked up, MoMo will initiate a transaction to transfer the funds from the MoMo control account to the destination account. Provided the parties can be resolved correctly, the transaction will complete and MoMo will respond to Fedwire to confirm that the transaction has been successful. If the transaction cannot complete successfully, MoMo will respond to Fedwire that the transaction could not be completed.

c. Transfer funds from a user’s FI account to MoMo account (pull). This transaction type will be used to transfer funds from an external account to an account holder’s account, but will be initiated from within the MoMo system. The initiator will select an account to transfer from from a list of defined accounts. MoMo will then send a request for the funds to be transferred to the FedWire service. The same service as is described in Section 1.b above will listen for a response from FedWire. When the response is received, the transaction will be completed if it was approved by the external FI, or declined if it was not approved.

2. MoMo will become a member of the FedWire system, and will start developing and testing its interface.

3. MoMo will set up agreements with other FIs that use the FedWire service to enable it, in the first instance, to exchange funds with them using push transactions. These interfaces will be tested and deployed.

4. MoMo will set up agreements with the other FIs that use the FedWire system to enable it to request funds to be transferred into MoMo accounts using pull requests. In particular, it will be necessary to agree and implement an authorisation process by which the users of the external FIs will be able to pre-authorise transfers from their accounts with those FIs to the MoMo system.

5. Once these agreements are in place, the pull transactions will be set up, tested and deployed.

6. The overall process will be packaged to enable interactions with new FIs to be set up and deployed with the minimum of cost and time.
Throughout the foregoing, references to the FedWire system should be taken to mean: the FedWire system in the first instance, or any system that is subsequently adopted by the Federal Reserve to replace it as part of the Faster Payments Initiative, such as an ISO-20022 based solution.

*Figure 20 Business Customer Integration Diagram*
Figure 21 Bank Integration Diagram

Figure 22 VAS Provider Integration Diagram
PART C: SELF-ASSESSMENT AGAINST EFFECTIVENESS CRITERIA

1. **Ubiquity**

Provide a self-assessed rating in the table below and then justify how the solution meets criteria for: accessibility, usability, predictability, contextual data capability, cross-border functionality, and applicability to multiple use cases.

**Self-assessed rating:**

<table>
<thead>
<tr>
<th>Effectiveness Criteria</th>
<th>Effectiveness Criteria Self-Assessment (Check One)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criteria Name</td>
<td>#</td>
<td>Consideration Name</td>
</tr>
<tr>
<td>Ubiquity</td>
<td>U.1</td>
<td>Accessibility</td>
</tr>
<tr>
<td>Ubiquity</td>
<td>U.2</td>
<td>Usability</td>
</tr>
<tr>
<td>Ubiquity</td>
<td>U.3</td>
<td>Predictability</td>
</tr>
<tr>
<td>Ubiquity</td>
<td>U.4</td>
<td>Contextual data capability</td>
</tr>
<tr>
<td>Ubiquity</td>
<td>U.5</td>
<td>Cross-border functionality</td>
</tr>
<tr>
<td>Ubiquity</td>
<td>U.6</td>
<td>Applicability to multiple use cases</td>
</tr>
</tbody>
</table>

1. **Justification for U.1 Accessibility:**

[U.1.1]
The Solution supports participation from financial institutions, businesses and individuals, whether those individuals have bank accounts or not. Each participant in the system, from an individual to the federal government, has a registered presence in the system. Activities within the Solution are executed against these presences, and not directly against the accounts of the participants in their original financial institutions. The Solution also provides for a connection between account presences within the Solution and accounts held with other institutions. Once these connections have been set up and configured, automated interactions between presences in the Solution and other accounts can be used to provide quasi-real-time reflections of activity in the Solution into other bank accounts. In addition, the Solution supports confirmation of transactions by entities outside the system where this is appropriate. For instance, where an individual want to pay a utility bill, confirmation can be obtained from the utility that the payment has been registered on their system before the transaction is confirmed in the Solution.

[U.1.2]
Because all interactions take place between presences in the Solution, checks on the validity of transactions can be made very quickly and reliably, and the completion of a transaction can be made extremely fast. Participants in the system can be immediately confident that their payments have reached the payee.

[U.1.3] The system will support multi-currency payments. The exchange rate available at the time of any transaction which involves more than one currency is shown to the initiator of the transaction before the transaction is confirmed, and the transaction does not proceed unless explicit authorisation is received from the initiator. The amount transferred is shown in the appropriate currency in statements for all the parties. Charges on transactions are levied and represented in the currency used by the party whose account is being debited or credited.

[U.1.4] The Solution is designed around the needs of the unbanked and, to an extent, the underbanked. In particular, it provides a Solution which anybody can join provided they have a Smartphone or a Feature phone, or access to the Internet. All a user need do to join is identify themselves and satisfy the KYC requirements applicable to the jurisdiction in which the Solution is implemented. No credit checks are required, and account holders can rely on the fact that money deposited in the system is not invested for any purpose. The system is supported by transactions on individual transactions, and for MoMo user transactions these are normally levied on a sliding scale which favours small transactions. In addition, users of the Solution are shown the charges levied on each transaction, and have a chance to decline the transaction if they feel the charges are too high. This method of financing has been proven to work in economies in which banking exclusion runs at far higher rates than in the U.S.A.

In the most recent FDIC survey of the unbanked and underbanked, the following four reasons were cited as the main reason for being unbanked by approximately 70% of respondents:

1. Do not have enough money (36%)
2. Don’t like dealing with or don’t trust banks (15%)
3. Account fees are too high or unpredictable (13%)
4. ID, Credit or Banking History problems (7%)

The Solution addresses these reasons directly in the following ways:

1. It is not necessary to have or deposit any money at all in order to subscribe to the Solution. Subscribers can set an account up, and then get salaries, benefits or remittances, paid into it. Once the money is paid in, it is immediately available for use in paying utilities, making purchases at participating business, or encashing.
2. The Solution is not a bank. Subscribers will not feel intimidated by needing to attend a bank branch to join the Solution, and, as already said, the Solution does not rely on the investment of deposits for its revenues, so subscribers are guaranteed that their money is always available if they want it. It is impossible for there to be a run on this Solution.
3. As already described, fees are transaction-based and are clearly shown before each transaction is confirmed. Because the fees are based on activity, subscribers do no find that they are paying them even during periods when they are making no use of the Solution.

4. Since the Solution does not offer credit to its subscribers, no credit checks are made when a subscriber joins the system. Since it is not a bank, no cross-checks are made on a potential subscriber’s history with other banks. The only checks are the irreducible minimum required by law to ensure that the Solution is not used to launder money. The Solution offers a fresh start to people whose only barrier to proper banking may be a history which is long in the past.

The other main characteristic of unbanked and underbanked people is that they need to rely on Alternative Financial Services (AFS) to a much greater extent than do bank users. The Solution also improves access to these AFS in the following ways:

- Subscribers to the Solution can receive payments directly from other subscribers rather than by checks. This means that salaries, payments for work undertaken by contract or casual labourers, and remittances can be made through the system and are directly available to the beneficiaries immediately.
- The Solution allows subscribers to use payments as required, rather than encashing the entire payment at once.
- The Solution protects the businesses which cash cheques. The Solution allows subscribers to encash part of their cheques with businesses which also subscribe to the Solution, and this money is transferred directly to their account in the solution with no charge to them, and with complete confidence that they will receive the money.
- The Solution protects subscribers who cash cheques at present. If they convert payments in the Solution into cash or goods at businesses who also subscribe to the Solution, then those payments are guaranteed by the Solution, and they can be clear about the cost of this conversion. They are protected from exploitation by businesses and individuals who use their lack of access to the banking system to overcharge them for financial services.
- The Solution provides services equivalent to prepaid debit cards, but without subscribers needing to apply for them separately. It is capable of supporting ATM withdrawals, and of providing all the other types of AFS described in the Management Summary of the FDIC report from providers who also subscribe to the system.

Since the Solution offers facilities to interact with other banking facilities, it will support the movement of subscribers into the conventional banking if this is required. Subscribers will be

---

1 “money orders, check cashing, remittances, payday loans, refund anticipation loans, rent-to-own services, pawn shops loans, or auto title loans” 2013 FDIC National Survey of Unbanked and Underbanked Households, Executive Summary, p.3 n.2
able to open bank accounts as and when their economic situation improves, and link these accounts to their presence in the Solution.

[U.1.5]
The Solution is designed to grow in two main modes, which are not mutually exclusive. The first is the organic mode. As stated above, a subscriber can join the Solution as an individual, provided that they have a mobile phone (or access to the Internet) and sufficient documentation to satisfy the applicable KYC certification. The Solution also provides facilities for government agencies and businesses of all kinds to subscribe to it, using either a mobile phone or the Internet. In addition to this, the Solution provides a mode by which P2P transactions can be used to send money to unregistered people. The recipient needs to register in order to receive the money, and can then go to any local business and ask them to register with the Solution, following which the funds received can be exchanged for cash or goods at the newly registered business. This mode allows the system to grow at a speed dictated by individual users and businesses.

The second mode allows bulk registration of subscribers. A business or government agency can register large numbers of subscribers (e.g. recipients of a government benefit, or current account holders of a bank) at the same time. There is also a tool which allows whole businesses, including a head office, branches, staff and tills, to be registered to the Solution in a single pass. This enables entire businesses, which may contain many branches and staff members, to register on the system.

With respect to connecting to new services or providers, whether financial or commercial, the Solution provides a model which allows individual service interfaces to be designed and transformed into RESTful interfaces automatically. This means that, instead of the considerable overhead of designing and maintaining a small number of general-purpose interfaces, with all the difficulty of testing and versioning that that model implies, a Provider wishing to interface with the Solution can ask for a bespoke interface which can be provided very quickly and subsequently modified as required by the individual client. The Solution combines this with a simple and flexible way of designing transactions, which enables new transaction types to be added and existing transaction types modified to meet the requirements of particular service providers.

[U.1.6]
The MoMo system itself does not include multiple operators or networks. However, it does provide interfaces which allow other operators to interface with it, covering the following use cases:

1. Services which are provided by other financial service providers. Where these services are provided, the Solution offers a way for providers to interface with its subscribers, and to provide services which are defined by a suite of transactions in the Solution. This includes the capacity to define multi-stage transactions, such that the external provider
can be contacted for approval (e.g. of a payday loan) before the transaction is completed in the Solution. For instance, a subscriber who offers a savings scheme, or a medical insurance scheme, or a payday loan scheme, can set up a service to offer those services to individual or business subscribers to the Solution. This is provided by a combination of:

a. A RESTful interface which is simple and quick to design for the specific purposes required. Once designed, our technology allows the interface to be defined and developed without (in most cases) any requirement for new code.
b. The ability to design internal transaction types quickly and simply (in most cases, without the need to write additional code.)
c. Techniques for modifying end-user interfaces simply and effectively. New user interfaces are provided on client demand, so that network resources are not tied up by mass updates being pushed out to subscriber phones. In normal circumstances, new transaction types only require configuration on the menus.

2. Services which articulate transactions within the Solution with transactions outside the Solution. For instance, the solution provides facilities to allow a utility bill to be paid by a subscriber. The financial part of the transaction takes place within the Solution, using the presence of the utility company in the Solution. But it is important to ensure that the financial transaction is also reflected in the utility company’s systems. This is supported either synchronously (when the pay bill transaction is not completed in the Solution until the utility company has confirmed that it has registered the payment in its systems,) or asynchronously (where the Solution does not wait to complete the transaction until the utility company has confirmed, and any discrepancies are managed by an automated reconciliation system.) The technical methods for providing transactions of this type are as described in Item 1 above.

3. Services which allow financial instruments outside the Solution to be interfaced with a subscriber’s presence inside the Solution. For instance, the Solution will allow subscribers who have bank accounts or credit cards to interface with their accounts in the solution, such that debits to their account in the Solution can be funded by automatic transfers from their accounts outside the solution, and credits to their account in the Solution can be transferred to their accounts outside the Solution, according to rules defined by the subscriber.

4. Bulk interfaces within the Solution. There is a generic bulk interface in the system which allows subscribers to define and perform large groups of transactions via the Internet. This functionality can be used, for instance, by employers to pay salaries, or by government agencies to distribute subsidies or benefits.

Where available, the interfaces to existing Financial Institutions will be ISO20022 or FedWire compliant
2. Justification for U.2 Usability:

[U.2.1]
The Solution is available via smartphones (Apple and Android versions), feature phones (using Java Midlet,) and the Internet. We also offer the facility for individuals who have none of the above, but who may be, for instance, the recipients of benefits from government agencies, to encash those benefits at an agent who is a subscriber to the system using fingerprint technology (if available) or unique identification.

At present, The Solution requires that a user be connected in order to confirm a transaction; however, defining a transaction and undertaking some other functions can be performed when the subscriber is offline.

The Solution allows payments to be initiated when the payee is identified solely by a MSISDN or a unique identification associated with payee on the payer side. There are checks within the system to ensure that any active MSISDN or payee identification is only associated with a single subscriber. Using MSISDN ensures that the system can function properly in markets where MSISDN recycling is a consideration. When encashing payments, the subscriber requests a voucher from the system, and it is the voucher that the Provider who is providing the cash presents to the system (the Solution allows for barcode scanning in order to make this process simple and effective.) The solution does not support money transfer by email address, although it stores email addresses for subscribers and could easily be extended to support this type of destination.

User authentication when drawing on their account in the Solution is always secure. The user has a PIN which they enter to verify their identity. In addition, and where required, corroboration such as a unique ID document is supported.

[U.2.3]
The solution is available 24x7x365, except for infrequent periods of planned maintenance, which are signalled directly to users well in advance. Because the Solution completes transactions within its own financial structure, users can always be certain that their funds are reliably present. In the event that a transaction fails, the subscriber is sent a clear message via the local application, so that there can be no doubt about the outcome of any transaction. In addition, individual subscribers can always see their current balance as part of the phone and internet applications. When the MoMo system is interacting with a third party service provider, it will reserve funds until the transaction is confirmed by the third party. This process is normally quick where the third party is a Depositary Institution, since the funds are transferred via FedWire (or such service as may replace FedWire as part of the Faster Payment Initiative.)

[U.2.4]
The Solution provides a simple interface which is easy to use and has help available at any time. Users of the Solution can opt to interact using a language other than English if required. In addition, subscribers can use the MoMo Account Holder Care facilities of the Solution to
carry out transactions on their behalf, subject to secure identification of the caller. Other than this, the Solution has no current specialised help for people with disabilities.

3. **Justification for U.3 Predictability:**
   
   **[U.3.1]**
   The MoMo service operates independently of all other parties for internal transaction services. Once funds have been provided for transferred into the system by Business/Government, bulk transaction can also operate independently.

   Where interoperation of services is required to deliver funds the system performs gracefully in the situation of interconnect issues with only payments to impacted channels being affected.

   **[U.3.2]**
   Account holders are provided tariff information on signing up for service and at the point of Agent interaction. Tariff information is available online and by request. (Since there are charges a client would incur for b/w to get particular tariff info, this isn’t a standard feature – but is possible for high value. Also we can have a Tariff information page on client (same as about), and then can do estimate for the charges (since this is simple)).

   **[U3.3]**
   Messages are returned to Account holders and Users in personalised culture (but standard way such that Back-office can function in English and specific language). Frontend integration such as Mobile Clients, Online Merchants and direct business use JSON RESTful and XML/SOAP APIs. The settlement processes use ISO20022 for standard Provider integration.

   **[U.3.4]**
   Baseline services are common across all service channels, limited only by security or channel limitations.

   **[U.3.5]**
   MoMo Account Holder Terms and Conditions set on the legal framework for the Account holders and similar for the Agents and other Businesses. The risk assumed by Account holders for real-time payment means that there is a commitment to maintain their security details and limits the remedial action in the case of User Error. In the case of system error or interoperation error, the finality of the transactions only occurs once confirmation is received and in the first instance, parties can access their accounts to confirm the recorded state of a request. Transaction can always be cancelled prior to finalisation. Once completed there will be an ad hoc resolution between parties.

   **[U.3.6]**
A key feature of the platform is the customisation of responses and service rendering based on channels. This has been found to be effective at improving accessibility and supporting adoption in local markets.

4. Justification for U.4 Contextual Data Capacity:

[U.4.1-3]
The Solution contains the capacity to vary simply and effectively the information which is captured and stored about participants and transactions in the system. This includes the capacity to modify the structure of the Solution’s persistent data store solely by configuration changes and without requiring code changes. In the same way, the structure of the messages which are used to interact with the persistent data store can be modified by configuration changes, and the changes rapidly deployed to users of the Solution either by phone or Internet, or via external interface. This enables the Solution to adapt flexibly to changing requirements (for instance, changes in legal requirements associated with various transactions) while still performing effectively.

All data types are mapped onto ISO 20022 data structures, and this allows data content to be represented in the standard ISO 20022 format for communication with external Providers, while not requiring the overhead of the ISO 20022 structures to be used in internal contexts, where message length is often a significant consideration.

Front-end integration is provided for specific use cases (e.g, mobile clients and online merchants) based on JSON and RESTful APIs. These exposes services based on the enrolment of the user and data capture is customisable per request type.

5. Justification for U.5 Cross border functionality:

[U.5.1]
The general operation of the MoMo cross border payments system is described in Part A, section 2, item 6 above. Specific characteristics of the cross-border solution are addressed in this section.

Security is provided by the following features of the solution:

- The MoMo solution supports specific limits for cross-border transactions.
- The MoMo solution supports identity capture in both the payer and payee Mobile Money systems.
- The MoMo solution supports AML checking in the payee system before foreign exchange is acquired.
- The MoMo system supports identification requirements in both the payer and payee Mobile Money systems.
And the MoMo system provides compliance and enforcement agencies with the ability to follow funds that would previously have been converted into cash.

[U5.2] The MoMo system is designed to partner with any other Mobile Money providers in other markets. The description of the interoperation of the process is given above. Messaging will default to ISO 20022 when there is no party yet operating in the market. Good Funds are delivered in agreement with FX Provider. In the case where MoMo is able to act as provider, this can follow the same process.

[U5.3] MoMo platform exploits multi-stage transactions to record any requests, pre-validate payer and payee, quote against the FX position, then get confirmation from the Account Holder on the terms. The agreements in place with FX Providers will require the quote to be irrevocable and non-repudiable. Commission charges levied by the payee system on such transactions will be defined and levied within the MoMo system, allowing the MoMo system to make a clear and unambiguous statement of all such charges to users before they initiate a cross-border transfer.

[U5.4] This will be supported as described in the process above. The MoMo system supports accounts of different currency. All transaction details recorded in the account are of the same currency, but to provide consistency in the accounting, a single transaction can have transaction details of multiple currencies, which are ensured to nett to a zero sum. All currency conversion is done with in the MoMo system at guaranteed rates: the payee’s Mobile Money system needs only deal in its own local currency.

[U5.5] Cross Border functionality will be available according to the implementation schedule shown in Section B, Part 1. Implementation Timeline.

6. Justification for U.6 Application to multiple use cases:

The Solution is specifically targeted at subscribers who are currently unbanked or underbanked. It is designed to improve their financial stability and provide a first step which will allow them eventually to join the main banking system. As such, it has the following key characteristics:

- Subscribers can join the system once they comply with the minimum legal requirements designed to prevent money laundering and fraud. No other qualification is required.
- Charges are low and are levied per transaction. In all cases, subscribers are informed of the charges that will apply before they confirm the transaction, and are shown the current balance of their account throughout their interactions with the system.
• The Solution does not offer any credit facilities, although it allows subscribers to interact with other Providers who may offer credit facilities. In these cases, the Solution does not permit those Providers to transfer funds out of subscribers’ accounts in the Solution without their express permission.
• The Solution allows account holders to interact directly with local small businesses in their area to deposit and withdraw cash, as well as to purchase goods or services.
• The Solution provides a simple interface, based around Excel spreadsheets, to enable small employers to make payments to their workforce, either as salary payments or as direct transfers.
• Subscribers to the Solution can send money to other people, whether those people are subscribers to the Solution or not. If the recipient is not a subscriber, then they can register with the Solution at an agent who is registered with the Solution, and encash the money straight away.

A detailed description of the use cases supported by the Solution is given in Part A, Section 3. An overall assessment of the ubiquity features of the MoMo solution in relation to broad classes of use case is given here.

**P2P**

The MoMo solution provides individual account holders the ease and convenience of controlling their finances on their mobile device 24/7/365. Statistics in the U.S. indicate that even the poorest unbanked and underbanked individuals have a mobile device. A scaled fee structure allows payments, as low as under $5, to be accessible to everyone. The sign up process is simple and does not require a deposit to complete. No minimum balance is ever required and there is no fee to open the account. Neither a lack of credit history, or an unsatisfactory credit history, is a barrier for a MoMo account to be opened, since transfers are only possible if there is a good money balance sufficient to cover the payment – it is not possible to overdraw the account. The solution supports both domestic and cross border P2P transactions. Payments to friends or family are completed in seconds with good money available immediately. Cash-in and Cash-out transactions can be easily accessed through the MoMo agent network. Financial Institutions, or any Non-bank account providers, can be linked to the MoMo account if the user would prefer to also have access to competing providers, as well as a MoMo Account, allowing MoMo to be an appropriate low cost alternative choice for all income demographics.

All stages of the transaction lifecycle, such as transaction history and current balance, are supported and easily available to the account holder. The MoMo life cycle process for a transfer is secure. Cross border payments are supported.

**G2P, B2P**

The MoMo solution provides Bulk Payers a cost effective method of making multiple, low cost, payments. MoMo’s payee convenience and demographic reach (see P2P immediately
above) provides a single solution to bulk payments in lieu of a mix of direct deposits, mailed checks or money orders, and cash. Ad hoc payments such as temporary worker’s wages and insurance claims are supported. The payment recipient pays no fee, and good money is available in seconds.

MoMo can easily interconnect with the payer’s financial institution or any Non-bank account provider to facilitate the payments with the appropriate contextual data necessary for the payee to determine who has paid and what the exceptions are supported.

All facets of the transaction lifecycle, such as transaction records and payment exceptions, are supported and easily available to the account holders. The MoMo life cycle process for a transfer is secure. Cross border payments are supported.

P2B – Bill Pay

The MoMo solution facilitates convenient bill pay for even the neediest demographic. This feature is available for one-off payments and regularly scheduled payments. MoMo is capable of consolidating payments (for example Telephone, Utility or Insurance bills) within the Payee’s MoMo account and making one lump sum payment to the Payee’s bank account with the appropriate contextual data necessary for the payee to determine who has paid and what the exceptions are. Ad hoc one time payments such as emergency bill payments, are supported.

MoMo can easily interconnect with the payee’s financial institution, or any Non-bank account provider. The payee pays a small fee per individual bill pay and the payer pays nothing.

All facets of the transaction lifecycle, such as transaction records and payment exceptions, are supported and easily available to the account holders. The MoMo life cycle process for a transfer is secure. Cross border payments are supported.

P2B – Retail Goods Purchase/Cash In/Cash Out

MoMo will have a broad network of agents where a MoMo account holder can spend their money, deposit cash into their account, or withdraw cash from their account – all in one visit. The payer has a small fee scaled to the transaction value.

All facets of the transaction lifecycle, such as transaction records and payment exceptions, are supported and easily available to the account holders. The MoMo life cycle process for a transfer is secure. Cross border payments are supported.
B2B

Similarly, Business MoMo account holders can pay bills at a low cost to each other. This alleviates the need for cash (decreasing theft), the lead time for the invoicing process and the costly and complicated process of the payee consolidating payments that are made in various methods such as cash, checks and bank transfers. Since good funds are available within seconds, Just-In-Time Supplier payments are supported.

MoMo can easily interconnect with the payee and the payer’s financial institution, or any Non-bank account provider, if the payee and/or payer would prefer to use the solution for the actual transaction and then transfer funds into their traditional bank account either on an ad hoc basis or periodically as needed.

All facets of the transaction lifecycle, such as transaction records and payment exceptions, are supported and easily available to the account holders. The MoMo life cycle process for a transfer is secure. Cross border payments are supported.
2. Efficiency

Self-assessed rating:

<table>
<thead>
<tr>
<th>Effectiveness Criteria</th>
<th>Effectiveness Criteria Self-Assessment (Check One)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criteria Name</td>
<td># Consideration Name</td>
<td>VE</td>
</tr>
<tr>
<td>Efficiency E.1</td>
<td>Enables competition</td>
<td>✓</td>
</tr>
<tr>
<td>Efficiency E.2</td>
<td>Capability to enable value-added services</td>
<td>✓</td>
</tr>
<tr>
<td>Efficiency E.3</td>
<td>Implementation timeline</td>
<td>✓</td>
</tr>
<tr>
<td>Efficiency E.4</td>
<td>Payment format standards</td>
<td></td>
</tr>
<tr>
<td>Efficiency E.5</td>
<td>Comprehensiveness</td>
<td></td>
</tr>
<tr>
<td>Efficiency E.6</td>
<td>Scalability and adaptability</td>
<td>✓</td>
</tr>
<tr>
<td>Efficiency E.7</td>
<td>Exceptions and investigations process</td>
<td>✓</td>
</tr>
</tbody>
</table>

1. Justification for E.1 Enables competition:

[E.1.1] The Solution allows partnering with any other Providers. The general Provider interface comprises:

1. The Provider will open accounts in the Solution to support their interactions with the Solution.
2. The Solution has a simple and quick means of generating transaction types to support the interactions required by the provider. These changes are normally configuration-only and do not require code modifications.
3. The Solution generates a RESTful interface to support the transaction types required. Again, this is generated through configuration and does not require code to be changed. The Solution generates multiple interfaces tailored to the requirements of particular interactions, rather than maintaining the overhead of a small number of generalised interfaces which are difficult to learn and cumbersome to change.
   a. The RESTful interface can be configured to support interactions using the ISO 20022 standard, or indeed any other standard that may be required.
4. Changes to the end-user functionality of the Solution are distributed as changes to the configuration of the user’s menus on the internet or their mobile device. Menus are configurable at the level of individual users, which allows, for instance, only subscribers who have signed up for a service provided by a third party to see the menu items relating to that service.

5. The transaction types and the RESTful interface described above are used to support reconciliation processes which enable money to be transferred between the Provider and the Solution.

This results in a generic method for interacting with external providers which is highly configurable, makes it easy to generate and change services, and which provides very fast and reliable completion of transactions by splitting the transaction itself from the reconciliation process, which takes place between the two systems.

In addition, users of Provider services will see any charges associated with the use of those services each time they request a transaction which is part of those services. The Solution will need to look at providing the ability to give users a general overview of the charges relating to any given area of the service, whether the area relates to services from an external Provider or charge internal to the system.

If Account Holders want to move from the MoMo Solution, they can withdraw their funds and close their account, or leave the account open, since it will incur no ongoing costs. Where accounts become dormant due to inactivity, the transaction details relating to the account will be archived as part of the Solution’s normal transaction archiving process. Accounts can be given a dormant status, and it would be feasible for the Solution to set this status if an account has not transacted for a defined period.

[E.1.2] Since Account holders can have multiple Mobile Apps, they could register for all mobile money providers and use the one that best meets their needs. This ensures a competitive market place for Providers to offer the best and innovative services.

[E.1.3] Charges are published in cases where most are incurred, since no account charge easy to understand. Service bundles will be offered to account holders that do high volume transactions to cap costs. Business users will subsidise bulk and payment collection transactions, therefore user costs are minimised, and paid for by those that benefit most.

[E.1.4] Inclusion in the MoMo system will be allowed for all providers as this increases the service level available to the end-account holders and leverages the fact that funds are held in the Fed thereby offering the fastest inter-provider settlement.
2. Justification for E.2 Capability to enable value-added services:

[E.2.1 - E.2.3]

The mechanism for defining and operating services from external Providers within the Solution has been documented in the preceding section. As regards value added services from external Providers, the mechanism documented there effectively gives external Providers access to the transaction mechanism of the Solution. By using these mechanisms, external providers can:

- Offer equivalents to the services provided by the Solution
- Offer additional services built on services provided by the Solution (e.g. account management for businesses using the system.)
- Offer additional services not offered by the system (e.g. payday loans.)

These services can be set up and defined quickly and cheaply, and will therefore be within the reach of small and local businesses. Since charging is made on a usage basis, there will be no up-front investment apart from the cost of setting the service up which, as already said, will be small.

3. Justification for E.3 Implementation timeline:

The timeline is based upon MoMo’s experience of commissioning similar mobile money platforms. Both as MoMo, where operations in El Salvador and Colombia are at various stages, and within other corporates the senior team at MoMo have experiencing of delivering services into Kenya, Tanzania, Afghanistan, India and South Africa.

The overall strategy is after a period of preparation, there is a pilot which will have a focused user group and allow the operational processes to be optimised. There after the national roll-out of services will begin. As is common with service delivery in the internet age, this pattern of piloting and releasing new services and features to Account Holders will be a hallmark of the continuous improvement of the service.

The scale of the service is based on both the technology and the Agent network. The latter is driven by commercial relationships with existing distribution networks across the country that support the training and agent management function. This approach allows for rapid scaling of the support and ultimately the Agent network to service Account Holders.

The key elements of these phases will encompass:

Initial Preparation

- Skeleton Corporate Structure with Key Personal
- Compliance testing
- Commissioning baseline platform
- Performance, Security and Risk reviews
- Customisation Business Processes (BP)
- Customisation Language and Tariff
• Customisation of legal T&Cs for all parties
• Marketing Themes
• Customisation of technical operational procedures

Pilot Launch
• Objective is to trial BP, Training and Operational practises for local conditions
• Limited Agent and MoMo Account User Care Capacity
• Validate legal and compliance procedures, ensuring scalable for national roll-out
• Tech Ops monitoring and reporting procedures
• Rolling phases of pilot for bringing services online. Within the pilot population, there will be a closed-user-group partner for all features from the start, to allow testing; the marketing will go in phases to allow the BPs and operational support structures to grow in a controlled way:
  o Phase A: Agents, Account Holders and Online Merchants
  o Phase B: SME Pay Salary Disbursement
  o Phase C: Payment Collection
  o Phase D: Large scale disbursement
  o Phase E: Forex
• Validate on boarding processes and procedures
• Validate marketing material

National Roll out

• Baseline services to become "Generally Available" in States where all compliance, regulatory and business infrastructure is in place to support.
• Marketing will lead the rollout into new States
• Ongoing training program will be in place and with the agent network partners
• Technical operations will monitor and scale solution as required. Using Cloud services allows rapid responses to peaks in service demand without being cost prohibitive.
• Compliance, Fraud and Security monitoring and procedure evaluation are ongoing activities for service operation.

Technical Development Stream

MoMo’s core technology platform is already complete and able to operate as a stand-alone platform. To be flexible, there are manual processes where against integration points so that rapid market deployments are possible. For example, if no direct banking interfaces can be established in the desired timeframe there are import tools that are managed via the Administration Website to allow for manual integration.

MoMo is committed to growing both internal services and ensuring APIs remain current for supporting FI and Commercial partners to deliver new services to our Account Holders. Therefore, MoMo has associations with key industry shaping organisations like IFC, CGAP
and Gates Foundation. This allows us to contribute and be aware of the trends in the industry. To realise these objectives, MoMo has an international team of product owners, architects, developers and development and technical operation teams that carry out research, development and operational support for the services we operate.

The technical tasks that are planned for in the timeline include:

- Identity Services (SSN) Integration
- FI Integration program allowing ISO API service interaction
- FedWire RTGS integration
- FedWire ISO 20022 RTGS integration as this becomes available
- Forex Provider integration
- Ongoing program supporting VAS Payment Collection for Commercial Entities
- Bulk Disbursements to extend custom XML to natively support ISO 20022 compliant messages.

4. Justification for E.4 Payment format standard

[E.4.1 - E.4.5]
Format standards fall into two categories. One category describes the content of payment messages. The second describes the syntax of payment messages – that is, the ways in which messages can be connected together to form the overall narrative which constitutes a financial transaction. The material collected in justification of E.1 and E.2 describes how the Solution allows communication contents to be connected together.

The Solution uses its own internal message format. This is necessary in order to enable the Solution to minimise network traffic in situations where bandwidth may be quite restricted, and where there is no requirement to communicate with other Providers. However, this can be converted at will into other formats. The solution maintains an internal mapping of its own data structures onto standard data structures such as those described in ISO 20022.

The system will support existing message formats for interfaces to FedWire and CHIPS. It will also support ISO20022 format messages for interfaces to Federal and Financial Institution transfer and clearing services as and when these become available.

For interfacing with other Providers, MoMo provides RESTful interfaces which accept JSON input. XML and SOAP interfaces can also be supported if required, and in future ISO20022 message structures will be supported.

5. Justification for E.5 Comprehensiveness:

[E.5.1 – E.5.2]
The Solution is designed as a stand-alone system, offering a comprehensive set of financial services to its users. This excludes any services which extend credit to subscribers: all the existing and planned features of the Solution rest on the principle that subscribers can only
dispose of their own money within the Solution. This does not, however, mean that the Solution will not support the provision of credit by other Providers, and this model has been successfully implemented in cognate versions.

Features already implemented in the current version, and available in all delivery channels which it supports, include the following:

1. Session initiation. This includes updating of user menus where required, to ensure that subscribers always work with up-to-date versions of the functionality supported by the system.
2. Authentication. Subscribers set up a PIN for themselves when they register with the system. They must enter this PIN before being able to access any menus or services, and again before performing any transactions which involve the movement of money.
3. Where the subscriber requests any transaction that involves the movement of money, the subscriber’s account will be checked to ensure that it has the funds required to complete the transaction (including charges.) If the funds are available, then they will be reserved. This prevents any double use of the same funds. In all cases, the subscriber is informed of the charges that will be made for processing the transaction. In cases where the Solution is interacting with other Providers, it will be the Providers’ responsibility to ensure that the funds required are authorised.
4. Since financial transactions take place within the Solution, no clearing is required. The money is moved directly between accounts within the solution.
5. Transactions are completed immediately the parties and amounts have been resolved and the transaction verified against the rules applicable to it. This completes the receipt and settlement steps.
6. Once transactions have been completed, the participating parties receive messages to confirm the transaction and their respective balances.

In cases where the Solution is interacting with other Providers, the following additional features are available:

1. When the transaction is initiated, a request can be issued to a party who is a Provider describing the requested transaction. This request can be synchronous (i.e. the transaction cannot proceed unless the Provider approves it) or asynchronous (i.e. the request is informational and will proceed whether or not the Provider responds.)
2. If the transaction is synchronous and the Provider declines it or fails to respond within a defined time-out period, then the Solution will also decline it and will pass the Provider’s reasons for declining it to the initiator.
3. When a transaction is ready for completion, a message can be sent to a party who is a Provider stating that the transaction is ready for completion. For synchronous transactions, the transaction in the Solution will not complete unless the Solution receives a response from the Provider confirming that the transaction has completed
correctly at the Provider’s end. Otherwise (including time-outs) the transaction will be cancelled and the initiator informed.

4. When a transaction has completed, a message can be sent to a party who is a Provider confirming that the transaction has completed in the Solution.

5. Communications between the Solution and Providers relating to individual transactions use a Conversation ID, which is shared between both parties, to identify the transaction. At any point, a Provider may query the status of a specific transaction using the Conversation ID, and receive a response in an agreed format.

6. The Solution supports a semi-automated process for reconciling with external Providers. This service consumes a list of transactions from the external provider in an agreed format, and checks them off against its internal record of transactions. Any mismatches are reported to both systems.

7. In addition, the Solution can produce, either automatically or manually, a list of activities against a given service for use in manual reconciliation, or in automated reconciliation using the Provider’s systems.

6. Justification for E.6 Scalability and adaptability:

[E.6.1-E.6.3]

The fundamental implementation policies of the MoMo system are based around the resiliency characteristics of the system as described in Section S.8 below. The design decisions that support resiliency, such as division into layers and the implementation of multiple processing nodes of identical capacity, also greatly increase the system’s scalability and adaptability. This section should therefore be read in conjunction with the section that responds to section S.8

Wherever possible, the MoMo solution is implemented on virtual machines and uses storage in the cloud. These design decisions mean that the configuration of the system can be changed readily and at very short notice to respond to temporary changes in system load, such as increased activity as a consequence of commercial promotions, or the processing of very large batches of transactions.

The following sections describe how these characteristics are implemented in the component layers of the system.

Public-facing Servers

The servers that implement the services which are directly consumed by end-user devices such as handsets or browsers are virtual machines which are implemented via an agreement with a cloud provider. These servers also run local data caches of configuration information, and they are fed by a load balancer, so that additional nodes can be added or removed at will. They are generated via a standard image, which is refreshed each time the server application software is upgraded. A standard rule of thumb, evolved over extensive system and performance testing, is that an application server can process approximately 25 transactions per second. This enables new servers to be brought on line readily as required, to support unexpected or planned increases in system
load. Normally, these servers will be brought on line in pairs, to make sure that full geographical resilience is available.

The load on the system in terms of connected users and transactions per second is displayed in the operations center, and TPS variance can be responded to within a 30-minute time window.

Assuming that peak TPS reaches approximately 1000 by the end of the first five years of the system’s life, approximately 100 public-facing servers will be required, assuming that full geographical redundancy is maintained and 25% redundancy is allowed to accommodate spikes.

**Private servers**

The private servers implement the internal process that actually create and execute transactions on the system. Like the public servers, they are virtual machines, implemented via a cloud provider, and fed by a load balancer. The same performance analysis and modification pattern applies to the private servers as to the public-facing servers, and they will typically be brought on line and taken off line in matching pairs. The consequence of this is that an increase in load of 25 Transactions Per Second (TPS) will result in a requirement for four additional servers: two public-facing servers to provide geographical resilience, and two private servers to provide geographical resilience and to service the requests of the public-facing servers.

Assuming that peak TPS reaches approximately 1000 by the end of the first five years of the system’s life, approximately 100 public-facing servers will be required, assuming that full geographical redundancy is maintained and 25% redundancy is allowed to accommodate spikes.

**Central data services**

A distributed database model such as is implemented by the MoMo system requires some centralised data storage. Centralised data storage is required for the following data classes:

- Configuration information. Configuration information is cached with the application servers in the public and private zones while they are in operation, but a centralised data storage area is required to act as the authoritative source for configuration.
- Subscriber and account header information. All application servers in the private zone need a central data location to identify subscribers and their accounts, although the detailed information about the transactions related to their accounts are held elsewhere.

This information requires a relatively small amount of storage. Our resilience architecture implies that any storage required for this system will be doubled, since it will be replicated in another location in case there is a failure in the first location; but this is an internal feature of the cloud data storage facilities that the MoMo solution uses, and can therefore be disregarded for the purposes of this analysis.
Cloud data storage can also be extended as required, and since the information stored centrally will be read many more times than it will be written, the requirement to scale this storage is expected to be infrequent and capable of being handled by normal operational review procedures, backed up by regular storage usage analysis.

**In-flight transactions**

In-flight transactions are stored in a distributed cache, backed by automated cache persistence to ensure that the system can recover from a catastrophe without losing information. Assuming that there is a relatively low elasticity in transaction completion time as loads increase, and that the data size of a transaction remains static with transaction volume, there is a simple and direct relationship between transaction throughput and the amount of cache space required to store in-flight transactions.

Additional servers can readily be added to a distributed cache array while it is in operation, provided that it has been set up to accommodate this configuration. There is no simple relationship, however, between required storage and the number of distributed cache servers required, since server redundancy needs to be taken into account. However, normal operational procedures supported by cache usage monitoring are sufficient to ensure that the cache does not become full.

**Completed transactions**

Once transactions have been completed, they are accessed via subscribers and/or accounts. In addition, the frequency with which this information is required drops off quite rapidly over time. With this in mind, the MoMo system organises its historic transaction information by account and time, and partitions this information by time. Once transactional information is over a year old, it is moved onto slower storage, so that it is still available, but its retrieval takes longer. The overall growth of storage requirements in this area is therefore relatively easy to predict, since new storage will typically be slow storage and the size required will be known in advance. There will be some increase in storage requirements as the throughput of the system increases and more transaction need to be stored in each time period, but the initial set-up of the system will allocate sufficient storage for the predicted first two years’ growth, and the situation will be regularly reviewed thereafter.

**7. Justification for E.7 Exceptions and investigations process:**

[E.7.1]
The solution is able to configure notification for transaction parties with information relating to the transaction performed, according the party’s role in it. These notifications can be set to be deliver via different channels so that the affected entity is not required to be logged in in order for them to be notified when transaction is resolved. In this way everyone involved in a transaction is notified when a transaction succeeds. If a transaction fails, only the initiator receives a message with a description of the reason for failure. The content of the notification
is configured according to the participation role and includes information relating to the performed action.

[E.7.2]
The solution captures information for all parties involved in a transaction, and also device information, in order to support auditing in relation to a single transaction or a specific party. The activity can be traced using back office site or any other available with entities depending of the security access of the user depending of the related role.

The system allows the generation of reports with transaction details, containing all parties participating in a transaction and charges for each one. This makes it easier to identify exceptions, failures cause, history transaction related with and relevant information to trace previously originated payments. This information is shown according to user access and depending on the user’s permissions may also check detailed information for each party to the transaction.

[E.7.3]
A set of reports as recurrent parties’ transaction, individual historical behaviour and unexpected balance record are available on the solution. When a resolution is complete Individual party can be banned to perform set of transaction according the role type assigned so this let system to decide if transaction can be or not authorized.
### 3. Safety and Security

**Self-assessed rating:**

<table>
<thead>
<tr>
<th>Criteria Name</th>
<th>#</th>
<th>Consideration Name</th>
<th>Effectiveness Criteria Self-Assessment (Check One)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety and Security</td>
<td>S.1</td>
<td>Risk management</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Safety and Security</td>
<td>S.2</td>
<td>Payer authorization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety and Security</td>
<td>S.3</td>
<td>Payment finality</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Safety and Security</td>
<td>S.4</td>
<td>Settlement approach</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Safety and Security</td>
<td>S.5</td>
<td>Handling disputed payments</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Safety and Security</td>
<td>S.6</td>
<td>Fraud information sharing</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Safety and Security</td>
<td>S.7</td>
<td>Security controls</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Safety and Security</td>
<td>S.8</td>
<td>Resiliency</td>
<td>✔</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Criteria Name</th>
<th>#</th>
<th>Consideration Name</th>
<th>Effectiveness Criteria Self-Assessment (Check One)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety and Security</td>
<td>S.9</td>
<td>End-user data protection</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Safety and Security</td>
<td>S.10</td>
<td>End-user /provider authentication</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Safety and Security</td>
<td>S.11</td>
<td>Participation requirements</td>
<td>✔</td>
<td></td>
</tr>
</tbody>
</table>
1. Justification for S.1 Risk Management

[S.1.1]
The MoMo system is designed for the maximum of configurability. Among the characteristics of the system which can be changed by configuration are:

- The types of transaction supported by the system.
- The parties to a transaction type and the part (e.g. debit, credit) that they play in the overall transaction.
- The types of user who are allowed to perform, or who are barred from, a particular type of transaction.
- The charges to be applied to the transaction, who is to pay the charges and who should be credited with them.
- The rules to be applied to transactions of a particular type, or to parties to transactions of a particular type.
- The actions to be performed as part of a transaction type, and the stage in the transaction when they are to be performed.

This offers a rich set of configurable changes, which enable the MoMo system to respond quickly to changes in laws or financial regulation. The changes still need to be made, of course; but they can typically be made in a short time and, since no code needs to be rebuilt, they can be tested and modified rapidly.

Where legal or regulatory changes cannot be accommodated within the existing framework, the MoMo system provides a reliable and robust pattern for developing new actions and incorporating them in the system. The rapid development methodologies followed by MoMo’s development team typically allow new code actions to be designed, developed and deployed within ten working days.

In addition, the MoMo solution’s flexible and configurable approach to interface design and implementation means that new interfaces can be set up, or existing interfaces changed to accommodate new rules, using rapid development techniques, since the interface too are generated largely by configuration.

[S.1.2]
The MoMo system does not depend on Settlement in the sense that any temporal or logical gap exists between the creation of a liability and its settlement. The MoMo system is set up so that fund transfers within the system are always made simultaneously. Where funds are to be transferred, they are first reserved, then finalised; and all of the changes in persisted data, from the first registration of a transaction to its finalisation, form part of the same database transaction group, such that if any part of the transaction fails, all parts of it are rolled back. This minimises the risk that any discrepancies within the balances attributed to the system can arise. (See Part A Section 1, 7 Settlement)
Since MoMo only operates with settled/good funds (except for commission liabilities,) the risk is simply that transactions are delayed (for example by external FI settlement processes and delays) or expired if not completed in the expected time frame.

In addition, the MoMo system allows for reports on the internal balances of the system to be drawn at any time. At any given time, the sum of balances in the system should be zero, since the balance in the system’s Control Account is equal and opposite to the sum of all other balances in the system.

At the same time, the balance of the system’s Control Account should be equal and opposite to the balance of the system’s Master account at the Federal Reserve. The only possibilities for discrepancy here relate to changes to the MoMo account at the Federal Reserve which have not yet been reflected in the MoMo system’s Control Account: that is, the purchase or sale of e-Money by subscribers to the system, as described in the Section “Transfer of funds between MoMo and non-MoMo accounts” above. In this context, “purchase” means the transfer of funds from a non-MoMo to a MoMo account, and “sale” means the transfer of funds from a MoMo to a non-MoMo account.

If discrepancies arise in this area, they are resolved through a reconciliation process which is run at regular intervals throughout the working day. The reconciliation process comprises an automated mark-off process to match records which correspond across the two systems, leaving only unmatched records to be dealt with manually. In all cases, the MoMo account at the Federal Reserve will be the authoritative source.

Funds in the MoMo system are fully backed by funds in a Management Account at the Federal Reserve. MoMo makes no use of the funds in order to run its business, and they are legally separate from the assets of the business. Since the accounts are with the Federal Reserve, failure to perform is not an issue.

These controls are based on the GSMA Risk Management Toolkit, where the following are addressed:

N-01 Financial reconciliation system and process for payments between bank and operator, ideally supported by direct system integration between bank and operator.
FIN-06 The value of Funds must at least fully cover total value of all electronic funds or payments in transit.
FIN-07 Funds insurance implemented and sufficient.
FIN-08 Funds are legally segregated from the operator's own assets in operation and in bankruptcy.
FIN-09 Control accounts are divided between banks (to spread risk) and transferable (in case of failure of the bank to perform)
MoMo implements Best Practice business continuity practices\(^2\) such as a high availability system, disaster recovery process and system backups. System monitoring is constant to avoid possible disruption and keep transaction tracking real time. Additionally, the solution implements best practice for service operations\(^3\) in managing the mobile money platform and mobile network as well as internal capacity management processes to support capacity management current availability, service growth forecast and MoMo solution expansion plans. The monitoring of service and availability of system assures superior performance against SLA (Service Level Agreement) requirements. (See S.8)

To avoid any manipulation of information by a third party MoMo employs GSMA industry specific data security, particularly when data such as certificates, service and user authentication is being shared. (See below)

The system also has strong internal user authentication mechanisms to ensure that employees may not directly access user accounts and/or request unauthorized transactions. Employees have restricted permissions in the system so that only role specific and appropriate access to the end user data and account access is allowed. All relevant documentation processes are stored for maintenance and review. Transaction logs with special time stamps and reference numbers track each access to the system and accounts.

The solution is able to interconnect Network data with billing system reconciliation to identify accounts where the information does not match that already held. Standardized checking (maker-checker) processes occurring real time decrease the risk of erroneous or fraudulent transfers becoming finalized.

To reduce the likelihood of errors during the entering of transaction details, several features have been built into the initiation process including establishment of an address book, requiring user to enter recipient’s mobile device number twice, and asking for confirmation.

MoMo control accounts for businesses and agents may be set up only after the organisation has been approved, a valid contractual relationship has completed, and a complete record of authorized users is obtained with a secure methodology outlined to support changes.

These controls are based on the GSMA Risk Management Toolkit, where the following are addressed:

- TEC-01 Implement best practice Business Continuity practices (high-availability system, disaster recovery process, system backups, system monitoring).
- TEC-02 Implement best practice for service operations and change management in managing the mobile money platform and the mobile network.

\(^2\) Services hosted on Microsoft Azure  
\(^3\) Services hosted on Microsoft Azure
• TEC-03 Implement capacity management processes.
• TEC-04 Monitor service and availability of system to measure performance against SLA.
• TEC-05 Strong data security, particularly when data is being shared (e.g. with bank partner).
• FR.T-04 Strong user authentication mechanisms to ensure that employees do not access other employees accounts.
• FR.T-02 Restriction of permissions in the system so that employees only have the access necessary to do their jobs.
• FR.T-11 Network vs. billing system reconciliation to identify accounts where the information does not match that already held.
• FR.T-13 Double-checking (requester-approver) processes enforced by system for financial money movements by operators.
• FR.T-19 Reduce likelihood of mistakes requiring reversal (e.g. address book for Account holder, making the user enter recipient’s number twice, asking for confirmation).

[S.1.4]
No sensitive information is stored on a user’s point of access – internet account or mobile device. A lost or stolen mobile device, without the user’s PIN, cannot access the MoMo solution.

In the case of a disputed transfer, the call center identifies the user through a formal process including identification of user ID, PIN, address, phone number, birthday and password or a combination thereof. MoMo agents provide guidance, during the account opening procedure, regarding secure methods of choosing a PIN. A case number is opened and an investigation is conducted.

When a cash-in/out transaction is requested from a MoMo agent, the recipient’s handset is required to be present to confirm transactions with receipt message.

User and transactional information are stored and retained according to local regulatory and commercial best practice standards.

The system logs every transaction (financial and non/financial) and exception report, and analyses them for suspect patterns, a series of reports are generated to detect suspicious behaviour and transaction tracking for both account holder and agent subscribers.

If a reversal or investigation is requested, a standard process (see E7) is completed that may involve the blocking of funds availability. The dispute resolution process is published to interested internal and external parties so that all parties can be aware of workflow and possible resolution actions.

During the on-boarding of outside operators and providers, due diligence is conducted by MoMo regarding not only the effectiveness of the operator’s or provider’s procedures for
sharing appropriate information related to their fraud and exceptions discovery, but also their preparedness to manage the issues outlined in S.1.1 –S.1.4.

These controls are based on the GSMA Risk Management Toolkit, where the following are addressed:

- FR.PY-06: Process and mechanisms to help call center operators to identify customers account holders. e.g. password or other information that only the account holder should know as identification number, birthdate, address, phone number
- FR.PY-07: Record-keeping. Records should be kept for a period determined by regulation or risk assessment (e.g. five years), either physically or electronically (or both)
- FR.T-06: Require PINs for account holders to securely identify themselves for every handset money transaction.
- FR.T-07: System to enforce hard-to-guess PINs, passwords and passcodes.
- FR.T-08: System to require recipient handset's presence at cash-in/out, and confirm transactions with receipt message.
- FR.T-16: Logging of every transaction, and transaction monitoring to look for suspect patterns, and exception reporting. Implement account holder and agent transaction monitoring.
- FR.T-17: Reversals: implement workflow within the system to confirm that the transaction actually happened and to approve the reversal.
- FR.T-18: System should hold funds in a reserved state while investigations are conducted.
- FR.PY-08: Implement strong AML policy & tools.
- CON-03: Publish an efficient dispute resolution process.

[S.1.5]
MoMo implements sanction and watch list screening on every payee transaction. During the on-boarding of outside operators and provider’s due diligence is pursued by MoMo regarding not only the effectiveness of the operators’ or provider’s procedures for sharing appropriate information related to their fraud and exceptions discovery, but also to their preparedness to issues outlined in S.1.1 –S.1.4.

These controls are based on the GSMA Risk Management Toolkit, where the following are addressed:

- FR.P-09: Sanction and watch list screening
- FR.P-12: Account blocking to prevent accounts being transacted
- AG-06: Agent penalty and termination process

[S.1.6]
MoMo maintains a continuous suspicious and fraudulent activity reporting process for account holders, staff, agents, operators and Providers including onward reporting to the regulator, and sharing with interested parties when appropriate. Watch lists are updated at appropriate intervals and industry fraud reporting sites/sources are monitored.
Appropriate employees are required to complete annual training including AML, KYC, Anti-terrorist Financing, Fraud Detection and reporting.

In case of account closure or account holder death an empty and close account holder mobile payment accounts process is carried out. History is retained.

MLRO is alerted of new employees or agents in the MoMo system so they can be trained on:
• Social engineering fraud risks
• Account holder due diligence / identity verification/KYC
• Anti-theft measures.
• Fraud awareness
• AML function and procedures

These controls are based on the GSMA Risk Management Toolkit, where the following are addressed:
• FR.PY-10 Implement a Suspicious Activity Reporting process for users, staff and agencies, including onward reporting to the regulator when appropriate
• FR.PY-11 Implement process and/or technical solution to empty and close user mobile payment accounts in case of phone account closure or user death.
• FR.O-01 Appointment of an MLRO
• FR.O-02 Implement effective AML function & procedures, with sufficient funding
• FR.O-03 Senior management commitment to AML-compliance.
• FR.O-06 Staff training programme
• FR.O-07 Staff training programme to focus on social engineering fraud risks
• CUS-03 Account holder awareness programmes, including encouraging account holders to use handset PINs to lock the device
• AG-09 Agent training programme to focus on Account holder due diligence / identity verification.
• AG-10 Agent training programme to focus on anti-theft measures.
• AG-12 Agent training programme to focus on fraud awareness.

2. Justification for S.2 Payer authorization:

[S.2.1 – S.2.3]
The Solution allows transaction types to be specified in such a way as to force the user to enter a confirmation (via a PIN, which can be changed at will by subscribers) at any point during the execution of a transaction.

The Solution will allow subscribers to set up regular payments, which may not require authentication. These facilities will support the following functions:
1. Allow a subscriber to select the type of transaction to be performed. A distinct set of transaction types which support regular payment definition will be maintained by the Solution.

2. Allow a subscriber to select the person or organisation to be paid. This can be defined either by MSISDN or by business number.

3. Allow a subscriber to specify the amount to be paid on each transaction. This can be set either as an actual number, or as a minimum payment, or as a whole bill payment.

4. Allow a subscriber to specify the regularity of the payment. Daily, weekly, monthly and annually are supported.

5. Allow a subscriber to specify the date on which the first payment is to be made.

6. Optionally, allow a subscriber to specify the date on which the last payment is to be made. If the date specified is not a date on which payment would be made, according to the values set by the subscriber in items 4 and 5 above, then payment will stop after the last date before the date specified in this item. If no date is specified in this item, then payments will continue until the subscriber cancels them.

7. Ask the subscriber to confirm the transaction before it is made. The ability to confirm a transaction is equivalent to the ability not to pay a payee, and the Solution will therefore include the facility to turn this function off for specific transaction types and payees. For instance, a subscriber may make regular top-up payments to a MNO pay-as-you-go plan. If one of those payments is not confirmed by the subscriber, then the supplier does not lose anything however the payer faces the probability of denial of service; if, on the other hand, a subscriber is using this facility to settle the minimum amount on a credit card bill, declining this payment may have serious repercussions on the subscriber’s credit rating and the creditor may not allow it.

The solution will use its existing bulk transaction facilities to schedule the transactions requested. The following special cases will obtain:

1. If the subscriber has elected to be asked for confirmation of the transaction and declines the transaction, then the transaction will fail, but a note will be persisted against it recording the reason for the failure.

If the subscriber has insufficient funds to make the payment, then the transaction will fail and the reason for its failure will be recorded. The Solution will not re-schedule the transaction.

3. Justification for S.3 Payment finality:

[S.3.1]
The Solution defines a payment as irrevocable when the transaction is completed. The point at which a transaction is completed is configurable and forms part of the definition of the transaction type. A typical structure is as follows:

1. The information content of the transaction request is checked for structural correctness. If these checks are passed, a persisted copy of the transaction is created.

2. The transaction parties are resolved.

3. The rules applicable to the transaction are checked.
4. If these checks are passed, the status of the transaction is updated to “Authorised” and the necessary funds are reserved on the debtor’s account. At this point, full details of the parties to the transaction and their account changes are persisted in the Solution.

5. Any intermediate transaction steps (for instance, a request for transaction approval from an external Provider) are performed.

6. If these checks are passed, the status of the transaction is updated to “Completed”, and the funds are debited from the debtor’s account and credited to the creditor’s account. Any charges are also applied at this point.

7. Messages are sent to the debtor and creditor, using the communication channels specified by them, to inform them of the transaction’s successful completion.

[S.3.3]
In the event that a payment is disputed, the payer can contact the Solution's MoMo Account User Care service facility. In the event that it is agreed that the payment was made in error, the solution contains facilities for raising a transaction to reverse the disputed transaction. This facility allows the original transaction to remain in the system for auditing, reconciliation and reporting purposes, while creating a new transaction which transfers the funds (including any charges) back to the payer's account. The solution contains facilities to source the funds used to recompense the debtor either from the creditor accounts, or from the solution's own accounts if this is not practicable.

4. Justification for S.4 Settlement approach:

Liquidity risks.

[S.4.1]
In order to use the MoMo solution, participants must establish a MoMo account. Within the solution, the process of completing a transaction is seamless and virtually instantaneous. Third Party Providers using the solution receive/pay good money within seconds along with all of the data necessary to support their account. Should a provider, or any individual with a MoMo account, wish to transfer funds from their MoMo account to a Depository Institution, this will be facilitated using central bank money. This transaction will be between MoMo, in favor of the provider's account, to a Depository Institution for deposit in the provider's account at that institution. These interbank transactions will follow the format and timeliness dictated by local regulations and custom.

It is possible, and is consistent with our experience, to further simplify this process by the Depository Institution itself establishing a MoMo account. In this case the payment would flow from the Depository Institution’s MoMo account to itself. Transactions from MoMo to a Depository Institution can be initiated 24/7/365 subject to instructions and local banking regulations.

Since the MoMo platform is cash only, settlement of funds between providers is required before the transaction is finalised. Funds are reserved in an Authorised state with the MoMo
Account until the external providers have confirmed the successful settlement. Settlement between MoMo accounts and depository institutions will be central bank money.

[S.4.2]
While there are some operational cases within the solution where an account may show a negative balance, those exceptions can only occur within a related set of accounts and do not create a situation where the master account holder will run a negative balance.

Similarly, there are no circumstances under which credit can be extended, either intentionally or accidentally, by MoMo to an account and vice-versa.

As in S.4.1, reserved and uncleared funds reflected in the system allow for protracted settlement times without exposure. Some limitations apply to the use of inter-provider switch mechanisms: for instance, in the case of FedWire, the service is only available for 21.5 hours per day.

Where transactions take some time to complete, the system manages any potential exposure in the following way. After a transaction has been authorised, any funds required to support it (including fees) are reserved on the debtor’s account to prevent double use of the funds, but no other changes are made to accounts in the system. This allows transactions to be held in a state of suspense without any risk to the overall balance of the system. This may be the case, for instance, when a confirmation is required from some external system before a transaction can be completed. When the response is received, the funds in the debtor’s account are released if the transaction fails; if it succeeds, the creditor accounts are updated and the debtor accounts debited.

All the funds in MoMo accounts are “good funds”

[S.4.3]
The solution will settle in central bank money. The MoMo service is intending to hold the Master accounts for the cash liabilities in the Federal reserve accounts so that all settlements between providers have no credit and liquidity risks.

5. Justification for S.5 Handling disputed payments:

For disputes arising from transfers between the solution and a Depository institution or Regulated non-bank account, the process will follow local regulations including Reg E. Reg Z is not applicable in either case as MoMo does not extend credit in any cases. Our procedures reflect local rules and regulations which will reasonably protect business and government payers as well as consumer payers

The following description outlines the handling of disputed payments within the solution and between individual and entity MoMo accounts.
[S.5.1] Disputed Payments

The solution has established rules, via Dispute Resolution within the MoMo Account User Care Service Department, for addressing unauthorized, fraudulent, erroneous, or otherwise disputed payments all subject to reasonable notification to MoMo, by the user and with regard to payment finality. Unauthorized activity may arise from the unauthorized use or theft of an account holder’s unique identifier. Any case of unauthorized use, fraud or erroneous payments will be reported to MoMo Account User Care service immediately for action.

The solution provides a mechanism for blocking funds where appropriate, the freezing of accounts, and mechanisms to hold rule violators accountable including the closing of the account.

[S.5.2] Consumer Protection

MoMo will establish polices and processes to make clear in account opening documents that, in appropriate cases, Consumer Payment Providers must comply with Consumer Protection laws related to Error resolution, Fraud and Unauthorized payments.

[S.5.3] Transaction Reversals

The solution provides a mechanism for any party to a transaction to request prompt voluntary return of funds from the payee, or the return of funds as required by law. Subject to payment finality.

[S.5.4—S.5.5] Protection against Losses

The Solution has adopted policies and procedures that reasonably protects payers against losses related to Errors and Fraud, and adheres to applicable laws and regulations. These processes will reflect local laws and regulations including Reg. E. For disputes arising from transfers between the solution and a Depository institution or Regulated non-bank account, the process will reflect local laws and regulations including Reg E.

Reg Z is not applicable in either case as MoMo does not extend credit in any cases.

These procedures reflect local rules and regulations which will reasonably protect business and government payers as well as consumer payers.

6. Justification for S.6 Fraud information sharing:

MoMo Account User Care Service will flag transactions suspected of fraud and refer to the Dispute Resolution Department for analysis. Transactions determined to be fraudulent will be investigated, resolved and recorded according to MoMo standard process.
[S.6.1] The solution will store, analyse and share information related to fraud with the appropriate interested providers, operators and entities. A central authoritative trusted repository may perform functions such as storage and aggregation of the information. Personally identifiable information will be protected. (See S.9, L.4)

[S.6.2] The solution will require entities with accounts within the MoMo solution to aggregate and report similar data to MoMo whenever possible. The timelines, content and security of the shared information will be outlined in the SLA with each provider.

[S.6.3] In MoMo, the instances of fraud will be collected Real-Time, and ex-post discovery internally and shared as per S.6.2.

[S.6.4] The solutions fraud collection process will be driven by automated processes.

[S.6.5] Shared data will be parsed to provide appropriate information in each case of sharing. End user data will be redacted and/or protected according to the appropriate Consumer Protection laws. (See S.7.1, L3, L4)

[S.6.6] MoMo may subcontract an outside, centrally authorized trusted repository to perform functions such as storage and aggregation of the data. Membership is expected in the Financial Services Information Sharing and Analysis Center.

[S.6.7] MoMo will analyse the fraud information for persistence using data at the individual transaction level.

7. **Justification for S.7 Security control:**

The MoMo B4P platform is focussed on integrity and prevention against data loss, evidence generation, activity tracking by using entire Microsoft stack feature of audit, and always-On to geographic redundancy. A robust IPS solution from Checkpoint helps to prevent intrusion risk from outside or even inside malicious persons, as per Integrity and Prevention, ISO 27001:2013 Annex 12.5, 12.4, 12.1.4
Identity Verification

Registration in the MoMo system requires applicants to verify that they are who they say they are. This is normally done through the presentation of unique identity documents, and their verification by people already registered with the system. It should be noted that, although the MoMo system can be downloaded onto a cell phone, and MSISDNs are used as a means of identifying, for instance, the recipient of a P2P transfer of funds, and a given MSISDN can only be registered to one user in the MoMo system, an applicant is not required to prove that they are the registered owner of the handset which they intend to use for the application.

Access Controls

The MoMo system ensures that users of the system can be verified at all times. When a user downloads the system onto their handset, he or she is sent a one-time PIN that they can use to activate the system. Once a user is registered with the system, they are given a PIN (which they can change at will) to access the MoMo system from their handset or browser, and a password which they can use to authenticate themselves with MoMo’s customer care facility.

Transmission Encryption

Data being transmitted between MoMo central services and user sessions is encrypted using HTTPS. For commercial partners using a MoMo API to communicate, an additional level of security is required using a 2048-bit certificate to authenticate the user. In cases where further security is required, a VPN can be set up to manage communications with a trusted partner where high-volume or high-value transactions are involved.

Communication with Financial Institutions via systems operated by the Federal Reserve is protected by the mechanisms mandated by those systems.

Data Encryption

Data on user handsets is encrypted using the handset’s software encryption facilities. User Passwords and PINs are always transmitted in an encrypted form, independently of overall transmission security, and are stored in the Database in an encrypted form which is separate from database encryption and therefore impervious to the removal of encryption from the database.

Data persisted in the MoMo database is also encrypted using database encryption.

Disks used for data storage in the MoMo system are protected by volume-level encryption using BitLocker.
Data Retention and Disposal Control

The database architecture provides a secure and traceable data retention. Its data model allows more than the 7 years required by 17 CFR Part 210 Security and Exchange Commission – Retention of Records Relevant to Audits and Reviews. The historic transactions store is partitioned by account and time. This design ensures fast access to recent sets of data, and also allows historic data to be moved onto slower storage, from which data can still be retrieved in the same context as more recent data, but response times will be slower.

Intrusion Protection

The MoMo system uses a standard layering architecture to protect its data from intruders. All publically accessible machines hosting interfaces to the MoMo system are insulated from the layers that handle data by firewalls. There are no direct connections between public-facing machines and the database itself: all database communications are handled by machines in the private zone.

Connections between application servers in the private zone and the database are via specific SQL Server account logins, whose passwords are encrypted. These accounts are only authorised to execute existing code on the database servers, thus protecting the database against injection attacks.

All application servers, both in the DMZ and in the business layer, run full anti-virus software with automatic updates.

Operational Procedures

No direct logons to application or database servers are permitted. Access to these servers is only allowed via remote desktop connections, and all RDC access sessions are recorded.

Deployments to application and database servers are performed without requiring operatives to log on to those servers, either directly or remotely. They are performed using specific accounts whose passwords are encrypted.

Access to application and database servers is controlled using group policies, and operators are only permitted to log on to these servers using their own login IDs. Operators must complete an entry in an access log before accessing either application or database servers. When operators leave the company or cease to have operational responsibilities relating to the live system, then they are removed from the relevant operational groups and their login accounts are deleted. Records are kept certifying that this process has been completed.

Backups of all persisted data are taken daily and are stored offline. The use of partitioning techniques on the database means that the amount of data that needs to be backed up remains
relatively constant, since backup volumes increase in size merely according to system size and usage, not additionally according to duration. Transaction logs are also backed up and stored offline.

**Monitoring and Incident Response**

Live implementations of the MoMo solution are monitored using New Relic APM, a product leader in the field of monitoring products on the Application level. This product is used to follow the performance of critical transactions across the entire service application environment, analysing the impact on performance of the time spent in specific code segments and even SQL statements. This is used to flag the most critical transactions, and to quickly spot when thing like response times, call counts, or error rates perform poorly, as well as to give deeper visibility into key transactions’ performance by showing transaction traces alongside long-running profiler results.

Once an event occurs, the monitoring tool uses an automated escalation process to send alerts to the Operations Team following Operations Service Level Agreement.

**8. Justification for S.8 Resiliency:**

[S.8.1 – S.8.5]

The target availability for the Solution is 100%, including keeping the Solution running while upgrades are being performed. In order to ensure that this target can be reliably met, the Solution implements the following architecture.

First, standard tiering techniques ensure that there is clear separation between those areas of the system which have different functions, as follows:

1. Functions which respond to external events
2. Functions which communicate internally.
   a. Areas that manage business logic
   b. Areas which manage data persistence.
      i. Servers that manage transactions in flight.
      ii. Servers that manage historic transactions.
      iii. Servers that manage reference data.

The system supports horizontal scaling in all areas, using the following techniques. First, for all areas except 2.b.ii above and 2.b.iii above, standard horizontal scaling techniques are used: multiple independent servers with the same code loaded are used, and the performance load is distributed among them by load balancers. This arrangement allows additional servers to be added as required, and allows code updates to be rolled out across the server estate while the system is running. All code updates are switched on and off in configuration, so that a deployment can be made while servers are still running the previous version of the code, and then all servers can be switched over to the new version by a single pass changing configurations.
Reference data used by the servers in these areas is sourced from a distributed cache rather than from the database itself. This means that the reference data is reliably available, since the cache is hosted on multiple nodes. Failure of an individual cache node does not compromise the operation of the cache overall. Updates to the underlying reference data are fed through to the cache when they are made, but the underlying reference data can be updated without affecting the operation of the cache.

Data for in-flight transactions is persisted in a distributed cache backed by persistent storage. This arrangement allows fast access to the transaction data, together with the resilience described in the previous paragraph. In addition, multiple transaction processing servers can access the same set of transaction data, which allows them to process transactions as required, without constraining a transaction to be always processed by the transaction processor that initiated it. This is an important consideration where transactions may not complete until, for instance, a response is received from another Provider. Writes to the cache are persisted to permanent storage, and persistence is completed before control is returned to the caller to ensure that there is always a permanent record of a transaction, whether or not it has in fact completed. A separate agent is responsible for removing finalised transactions from the cache, and persisting them in the historic transactions area. This agent can be horizontally scaled to cope with demand and to ensure that the cache continues to be cleared even if one of the agents fails.

Second, for area 2.b.ii above, clustering techniques are used. These allow multiple instances of the database server to be used. If one of the servers fails, the processing work will automatically be transferred onto another server. The servers share storage, and the underlying storage is resilient because it is replicated separately from the servers using SAN replication. This design also allows servers and storage to replicated across geographically separate sites, which ensures that a catastrophic DC failure will not stop the operation of the system. The fact that this storage area only contains historic information means that a buffer is available: if processing is transferred from one database to another, there is a period during which the storage is unavailable. During this period, completed transactions can be allowed to build up in the cache and the backlog cleared once the server transfer is complete. Regular operational monitoring ensures that the cache of transactions always has sufficient space to store the completed transactions during a failover, and that sufficient agents are available to transfer the completed transactions from the cache to the historic transactions area within a defined period after the server transfer is complete.

The data held in the historic transactions store is partitioned by account and time. This ensures that rapid access to sets of data is possible, and also allows historic data to be moved onto slower storage. As well as improving the efficiency of access to the data, partitioning allows the data relating to sets of accounts to be stored on different servers, thus allowing horizontal scaling in this area of storage retrieval if required.

Third, for area 2.b.iii above, the data actually used in the rest of the application is held in a distributed cache. This cache is resilient to failure, as described above, and the only point at which
the persisted reference data is required is when the data is to be changed, and the cache needs to be updated with new data. The reference data is therefore held with the historic data, and control can be transferred to alternative servers in the case of system failure in the same way as is described above.

The partitioning of the application described above ensures that it is both resilient to the failure of any single component and can be scaled so as to accommodate transaction throughputs up to very high levels. Although each individual area is resilient and can be scaled, different strategies are adopted in each area so as to provide a solution in each area which is best adapted to the requirements of that area.

In addition, the Solution supports access resilience. Alternative access methods are provided to users of all kinds, so that account holders are not prevented from using the service because of failures in their handsets. People who work for businesses which are part of the MoMo ecosystem can access the system either through browsers or via their handsets, and will not, therefore, be prevented from using the system even if their company’s internal network is down.

The system also supports resilient business availability. MoMo is committed to providing the widest possible network of businesses which will allow account holders to register, pay their bills, and deposit and withdraw cash. This means that, even in circumstances where one outlet is closed or otherwise unavailable, account holders will be able quickly to find another outlet which can meet their needs. The MoMo handset application also provides a facility which enables account holders to find the nearest business which will support their transactions.

MoMo solution will be located in cloud service of Microsoft named Azure (MS Azure), as enterprises adopt public and hybrid cloud solutions, they do extensive due diligence on their provider’s security policies, operations, and systems. Confidential data is the lifeblood of any company, and many industry companies are also bound by extensive regulations regarding the use, transmission, and storage of account holder user data.

MS Azure provides businesses with the data security and privacy, control, and transparency they require. Security and privacy are embedded in the Azure platform, using the Security Development Lifecycle (SDL), from initial planning through solution launch—as well as the upgrades we continue to make. Operational Security Assurance provides security guidelines for our operational processes, and Privacy by Design governs how we build and operate products.

MS Azure uses multiple safeguards to protect accounts holders sensitive information and enterprise data. These security practices and technologies include: Identity and access management – Azure Active Directory helps ensure that only authorized users can access your environments, data, and applications, and provides multi-factor authentication for highly secure sign-in.
Encryption – Azure uses industry-standard protocols to encrypt data as it travels between devices and Microsoft datacenters, and crosses within datacenters.

Secure networks – Azure infrastructure relies on security practices and technologies to connect virtual machines to each other and to on-premises datacenters, while blocking unauthorized traffic. Azure Virtual Networks extend your on-premises network to the cloud via a site-to-site virtual private network (VPN). Also ExpressRoute can be used to create a cross-premises connection when needing to use the Internet.

Threat management – Microsoft Antimalware protects Azure services and virtual machines. Microsoft also uses intrusion detection, denial-of-service (DDoS) attack prevention, penetration testing, data analytics, and machine learning to constantly strengthen its defence and reduce risks.

Compliance – We comply with both international and industry-specific compliance standards and participate in rigorous third-party audits, which verify our security controls. Account holders maintain full ownership and control over their own data. We are a leader in providing transparency about our privacy practices—one reason we have adopted the world’s first code of practice for cloud privacy, ISO/IEC 27018.

9. Justification for S.9 End-user data protection:

[S.9.1]
The Solution provides full concealment of any internal identifiers. Normal subscribers are identified by MSISDN; businesses and other providers are identified by a business number assigned to them when they join the system. In cases where choices are sufficiently restricted to make this a viable option, subscribers are shown a drop-down of available candidates by name—an example might be payday loan providers. In all cases, the selection of the type of account to be paid into is made by the definition of the transaction within the system. This is configurable and can be changed at will.

The solution also offers a name search function which will allow subscribers to confirm recipients by showing the subscriber’s name, subject to anti-phishing safeguards.

[S.9.2, S.9.3]
The Solution implements a full role-based security model, which ensures that subscribers to the system are not permitted to perform operations or to see information to which they are not entitled. Each subscriber to the system has one or more roles assigned to them; and every transaction and data access function (including reports) has a definition of which roles a subscriber must have in order to initiate the transaction or access the data. The security model includes facilities to allow people access in virtue of their belonging to specific organisations, so that, for instance, employees of an organisation are allowed to view data relating to that organisation; and allows permission settings to support standard business process such as maker/checker.
10. Justification for S.10 End-user / provider Authentication:
[S.10.1-S.10.6]

A number of communication security features are used, including:

- HTTPS is required for connectivity to standard MoMo services.
- Sensitive fields are secured with an additional layer of AES encryption.
- Client certificates (2048 bit) are required on agent terminals.
- Trusted partners must connect via secure VPN.

In addition to communication security, some key measures are taken to secure data on the handset:

- The secure keystore provided by the mobile platform is used where available (iOS, Android).
- Data stored on the handset is fully AES encrypted on all platforms.
- Inactivity timeouts, app switching and screen locking all cause the user to be logged out automatically.

Transport security

Access to the MoMo services can be split into three main categories, as follows.

1. Public connections are categorised by MoMo account holders connecting from their handsets over the public Internet. HTTPS is the preferred transport protocol and is used wherever possible. There is a special case for older handsets that cannot support HTTPS, as detailed in the following sections.
2. Commercial Partners is a category covering agent terminals. These connect over the public Internet via HTTPS and are required to use a 2048-bit client certificate to provide an additional level of client authentication.
3. Trusted Partners is a category covering banking institutions. These connect the B4P services via HTTPS over a secure VPN. A client certificate may also be used.

Device security

ON-DEVICE ENCRYPTION

The mobile client app makes use of the secure keystore facilities available on the iOS and Android platforms to reduce the risk of individual encryption keys being compromised on the handset. On all platforms, data such as transaction history, menus and downloaded resources are stored in an AES-encrypted database to reduce the risk of personal information being compromised on the handset. In all cases, the local AES keys are unique to that instance of the client app, which ensures that a compromised handset is only a security hazard for the users of that device and not the wider user community.
MESSAGE ENCRYPTION

Each time the mobile client app is installed on a new device, an app registration process must be completed before it can be used. During this process, the app securely exchanges a shared AES key with the MoMo services. The key is used to encrypt sensitive fields such as PIN numbers when they need to be transmitted to the services. Whilst the connection is already secured by HTTPS, the message encryption provides additional protection in scenarios such as man-in-the-middle attacks, in which a client might be duped into communicating with a 3rd party service.

JAVA HANDSETS

A Java MIDlet edition of mobile client app allows older “feature phone” devices to connect to MoMo. These devices typically do not have sufficient hardware resources to support HTTPS, and the MoMo transaction services cannot be accessed via plain-text HTTP. However, the devices are able to support some of the key features of HTTPS, including RSA and AES cryptography. This has allowed the development of a secure MoMo proxy service for the MIDlet clients so that a shared AES key can be securely exchanged using public-key cryptography, and then all subsequent communications can be encrypted in full using the shared secret key.

Underneath the proxy encryption, the Java client uses the same messaging protocol as is used by the iOS and Android clients, which includes the requirement to individually encrypt sensitive fields.

APP REGISTRATION PROCESS

The mobile client app requires the user to complete a two-step app registration process before it can be used for the first time. The process must be completed by a user care who has already registered with a MoMo agent. In the first step, the user care is required to enter the national ID that was used to register with the MoMo agent. This begins an audit trail that links the app instance with the user care.

The second step begins with MoMo sending a new PIN via SMS text message to the user care, which remains valid for one hour. The user care must enter the correct PIN within the expiry time to complete the registration process. Having the PIN sent by SMS helps to further validate that the registration is genuine.

AUTHENTICATION PROCESS

Account holders log on to mobile client app using their MSISDN and PIN. Internally, the login process has two stages: service authentication, followed by user authentication. In the service authentication step, the app authenticates with the MoMo service using the shared AES key and unique IDs that were exchanged during the registration process. The first step helps to verify that the app instance is genuine. In the second step, the user care’s MSISDN and PIN are verified by the service.
AUTHORISATION PROCESS

As part of the authentication process, the user care’s session is started. The user care’s session is issued with a set of menus that allow the user care to transact, and authorisation to perform the transactions is granted. The authorisation is a distinct entity that is allocated to the user care for that session.

ACTIVITY AUDITING

Once logged on to the MoMo services, all transactions are carried out using the authorisation granted to the user care for that session. For every transaction, the service logs the authorisation ID under which it was initiated, along with all other details of the transaction such as credit party, debit party and whether the transaction succeeded. This provides an audit trail that links each transaction back to a specific user care session.

SCREEN LOCKING

The mobile client app automatically logs the user out if it detects a period of inactivity of more than a few minutes. The client app also logs the user out if it detects that the handset has been switched to a different app or the screen is locked.

AML/KYC

The Solution also complies with AML/KYC regulations in all markets where it is implemented. It supports the bulk import of entities and their assignment to configurable categories. Categories are defined as roles, and the Solution provides facilities for expiring the period of application of a role (for instance, when a conviction is spent.) It has built-in facilities for importing the OFAC and ONU lists maintained by the US Federal government. Members of these categories may be identified by unique identifiers such as a tax number, a Social Security number or a passport number, or they may be identified by name only.

The Solution also supports the definition of PEPs (Politically Exposed Persons) and allows PEPs to define lists of individuals and businesses which are related to them following their registration as subscribers. If a PEP fails to provide such information within a defined (and configurable) period after registering, then the Solution will suspend the PEP’s registration until the information is provided.

In addition, the Solution provides facilities to specify that individuals or organisations who are named on certain defined lists are banned from participating in any way in transactions of particular types: for instance, registering with the system or depositing or withdrawing cash. These transaction types, and the lists associated with them, can be set up and changed by configuration changes only. If an individual is identified by name only, then individuals which fully match that name are permitted to transact, but appear on a report which identifies all transactions undertaken by people whose names match a name on a blacklist which does not have a unique identifier.
The Solution provides a fully suite of reports allowing the tracking of attempts to access the system by individuals and business who are not permitted to transact.

11. Justification for S.11 Participation requirements:

[S.11.1-S.11.3]
The emerging standard for financial inclusion systems, of which MoMo is one, has been developed by the Bill and Melinda Gates Foundation, and is called the LevelOne Project. MoMo is aligned with the stated aims and principles of this system as described below:

Open Loop

The specification states: “The system should be an open loop, with the objective of encouraging all qualified participants to join. Open-loop systems avoid duplication of efforts by individual participants, which keeps costs down and optimizes services delivered to end users. Ultimately, an open-loop system achieves interoperability through the direct participation of all providers.”

MoMo implements this feature, first, by providing functionality that enables other Financial Services Providers to interact with the MoMo ecosystem and to offer their products directly to MoMo subscribers, whether those subscribers are businesses or individuals. This functionality is designed to be simple and quick to set up, while complying with best practice for preventing fraudulent and/or criminal use, as described below.

Push Payments

The specification states: “The system should effect push rather than pull payments. Push payments, such as an ACH-type employer direct payroll deposit, work when the payer instructs their account holder to move money to the payee’s account holder. This contrasts with pull payments, used in card and direct debit systems, which work when the payee’s bank requests money (“pulls”) money from the payer’s account holder.”

MoMo implements this feature by only allowing push payments. There are no circumstances within the MoMo ecosystem where a party is allowed to withdraw funds from a MoMo subscriber’s account unless the subscriber has authorised that payment. However, the MoMo ecosystem does offer facilities which allow a user to generate a voucher which can be presented by another party (such as an on-line business) as a pre-authorised request for payment.

Same Day Settlement

The specification states: “The system should settle funds among participants at least once a day, to ensure the system and its participants have as close to zero exposure from a failing participant as is possible. This controls liquidity risk, and therefore reduces costs.”
MoMo implements this feature by settling transactions immediately within the MoMo ecosystem. Provided that transaction requests comply with the system’s rules, they are completed immediately and irrevocably, and the result of the transaction is displayed immediately in the creditor’s and debtor’s accounts. This directly covers the cases of the financially excluded who are MoMo’s target audience.

Where money is being transferred between the MoMo ecosystem and the wider financial world, MoMo is dependent on the rules for transfers established in the wider banking community. Where money is being transferred from a MoMo subscriber’s account with a Partner FI to their account in the MoMo system, then MoMo will issue a PSP request to the Partner FI’s payments gateway. This is the same mechanism as is used for credit card payments, and will allow payment requests to be approved quickly, so that the money can be transferred into the subscriber’s MoMo account, and then settled with the Partner at end of day. Where money is being transferred from a subscriber’s MoMo account to their account with a Partner FI, then MoMo will use a standard clearing mechanism such as CHIPS to make the payment.

**Open, international Standards**

The specification states: “The system should adhere to internationally accepted payments standards (such as ISO 20022) rather than implementing system-specific, proprietary standards.”

The MoMo system is committed to communicating with its partners using open standards where this is feasible. The system uses a translation system to ensure that its internal data can readily be converted into a number of internationally agreed format as required. In practice this means a typical model of using JSON based RESTful APIs for front-end services and mobile clients, while Financial Institution integration for electronic funds are using ISO20022 or other standards as partners require.

**Irrevocability**

The specification states: “The system should not specially manage transaction reversal by the originating party nor specify situations in which the liability for a transaction is passed from one participant to another. This eliminates the complexity and services infrastructure required by the system to reverse transactions, thereby eliminating significant system cost.”

The MoMo ecosystem does not permit transactions to be reversed by the originating party. Once a transaction is confirmed by the originator and validated by the system, it cannot be reversed. There are some special circumstances where completion of a transaction is dependent on some external event (such as confirmation by a utility provider that a bill payment has been registered in their system, for instance;) and in these circumstances a transaction may time out or be cancelled for other reasons. However, this process happens before the transaction is finalised, and therefore does not affect the requirement for irrevocability.

However, the MoMo system does allow for the manual reversal of transactions by its Account Holders Care service operatives, under certain special circumstances which are defined by
MoMo’s code of business practice. In these circumstances, a reversal transaction is created and linked to the original transaction, to make it clear that the reversal is a separate transaction.

**Shared Fraud Service**

The specification states: “The system should address how participants may contribute transaction data (either on fraudulent or on all transactions) to a commonly owned fraud management service.”

The MoMo system is set up to respond to external fraud definitions. It supports the creation and maintenance of numerous lists, including lists automatically generated by external organisations such as OFAC and ONU, and is also capable of contributing lists of subscribers and subscriber activity to external fraud detection parties, in the form either of structured lists or reports.

**Tiered KYC**

The specification states: “The system should enable tiered “know your customer” (KYC) that allows for participation by end users in correlation to level of use. For example, people lacking documentation may open basic accounts, and the risk related to these accounts may be managed by imposing strict maximum account balance and transfer limits.”

The MoMo system supports tiered KYC, and the application of different rules and charges to members of the different tiers. It also supports the automation of bulk moves of subscribers from one tier to another, based on configurable rules.

As these requirements become more concrete, and as definite standards evolve for measuring compliance, MoMo will ensure that its solution remains compliant with them.

**GSMA Principles**

In addition, the GSMA provides a checklist of principles to be followed by Mobile Money Operators ([http://www.gsma.com/mobilefordevelopment/programmes/mobile-money/policy-and-regulation/code-of-conduct/](http://www.gsma.com/mobilefordevelopment/programmes/mobile-money/policy-and-regulation/code-of-conduct/)) An analysis of the MoMo system’s compliance with this document is given below:

<table>
<thead>
<tr>
<th>GSMA Requirement</th>
<th>Compliant</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1.1 Providers shall ensure that funds equal to the total value of outstanding mobile money liabilities are held in one or more custodial accounts on behalf of the mobile money users (“users”).</td>
<td>Yes</td>
</tr>
<tr>
<td>1.1.2 Providers shall ensure that user funds are ring-fenced to prevent attachment from the creditors of the provider in the event of a provider’s insolvency</td>
<td>Yes</td>
</tr>
<tr>
<td>1.1.3 Providers shall take measures to mitigate risk of loss of funds due to insolvency of the bank, bond issuer, or other entity in which funds are invested.</td>
<td>Yes</td>
</tr>
<tr>
<td>GSMA Requirement</td>
<td>Compliant</td>
</tr>
<tr>
<td>------------------</td>
<td>----------</td>
</tr>
<tr>
<td>1.2.1 Where feasible, providers shall only authorize user care transactions in which the debiting and crediting of mobile money accounts is processed in real time.</td>
<td>Yes</td>
</tr>
<tr>
<td>1.2.2 Providers shall regularly reconcile transactions and settle balances with financial ecosystem partners</td>
<td>Yes</td>
</tr>
<tr>
<td>2.1.1 Providers shall develop effective policies and procedures for Anti-Money Laundering and Combating the Financing of Terrorism (AML/CFT) compliance.</td>
<td>Yes</td>
</tr>
<tr>
<td>2.2.1 Senior management shall demonstrate their commitment to AML/CFT compliance through proper oversight</td>
<td>Yes</td>
</tr>
<tr>
<td>2.3.1 Providers shall appoint a qualified employee to promote and monitor compliance with AML/CFT-related obligations.</td>
<td>Yes</td>
</tr>
<tr>
<td>2.4.1 Providers shall create a system to monitor transactions for AML/CFT purposes.</td>
<td>Yes</td>
</tr>
<tr>
<td>2.5.1 Providers shall properly identify clients and may use a risk-based KYC approach if permitted by local laws and regulations.</td>
<td>Yes</td>
</tr>
<tr>
<td>2.5.2 Providers shall place appropriate risk-based transaction and balance limits on accounts, depending upon the strength of account holder care identification and verification.</td>
<td>Yes</td>
</tr>
<tr>
<td>2.5.3 Providers shall have the ability to block account transactions under certain circumstances.</td>
<td>Yes</td>
</tr>
<tr>
<td>2.5.4 Providers shall screen accounts using domestic and international money laundering, terrorist financing, and sanctions watch lists.</td>
<td>Yes</td>
</tr>
<tr>
<td>2.6.1 Providers shall ensure that staff and agents are properly trained in AML/CFT procedures.</td>
<td>Yes</td>
</tr>
<tr>
<td>2.6.2 Providers shall monitor staff and agent compliance with AML/CFT procedures.</td>
<td>Yes</td>
</tr>
<tr>
<td>2.6.3 Providers shall develop clear policies and processes for addressing staff and agent AML/CFT violations.</td>
<td>Yes</td>
</tr>
<tr>
<td>3.1.1 Providers shall conduct proper due diligence on potential staff, agents and entities providing outsourced services.</td>
<td>Yes</td>
</tr>
<tr>
<td>3.2.1 Providers shall develop and implement training programs for staff and agents</td>
<td>Yes</td>
</tr>
<tr>
<td>3.3.1 Providers shall establish written agreements governing their relationship with agents and entities providing outsourced services.</td>
<td>Yes</td>
</tr>
<tr>
<td>3.3.2 Providers shall assume responsibility for actions taken on their behalf by their agents (and any sub-agents) under the provider-agent contract.</td>
<td>Yes</td>
</tr>
<tr>
<td>3.4.1 Providers shall develop policies and processes for ongoing management and oversight of staff, agents and entities providing outsourced services.</td>
<td>Yes</td>
</tr>
<tr>
<td>4.1.1 Providers shall ensure that the Board of Directors and senior management establish effective management oversight.</td>
<td>Yes</td>
</tr>
<tr>
<td>GSMA Requirement</td>
<td>Compliant</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>4.2.1 Providers shall develop and implement service-level monitoring and reporting systems.</td>
<td>Yes</td>
</tr>
<tr>
<td>4.3.1 Providers shall take steps to ensure sufficient network and system capacity through forecasting, monitoring, and testing.</td>
<td>Yes</td>
</tr>
<tr>
<td>4.4.1 Providers shall set up an incident management process to restore the service within agreed service levels and to investigate root causes of problems</td>
<td>Yes</td>
</tr>
<tr>
<td>4.5.1 Providers shall develop processes to ensure that systems and applications remain robust and secure following system and configuration changes</td>
<td>Yes</td>
</tr>
<tr>
<td>4.6.1 Providers shall establish a risk management framework for identifying, assessing, and controlling risks.</td>
<td>Yes</td>
</tr>
<tr>
<td>4.7.1 Providers shall develop effective business continuity and contingency plans.</td>
<td>Yes</td>
</tr>
<tr>
<td>5.1.1 Providers shall develop, implement, and regularly review a formal security policy for mobile money services.</td>
<td>Yes</td>
</tr>
<tr>
<td>5.1.2 Providers shall screen, train and monitor internal staff.</td>
<td>Yes</td>
</tr>
<tr>
<td>5.1.3 Providers shall ensure policies are in place for secure handling of information and assets</td>
<td>Yes</td>
</tr>
<tr>
<td>5.1.4 Providers shall ensure protection of their assets that are accessible by suppliers and third parties.</td>
<td>Yes</td>
</tr>
<tr>
<td>5.2.1 Providers shall ensure that data is protected by cryptography and network security controls</td>
<td>Yes</td>
</tr>
<tr>
<td>5.2.2 Providers shall ensure that systems and applications are designed and developed securely and are thoroughly tested</td>
<td>Yes</td>
</tr>
<tr>
<td>5.3.1 Providers shall identify and assess security risks prior to offering mobile money services and shall continue to monitor such risks on an ongoing basis</td>
<td>Yes</td>
</tr>
<tr>
<td>5.3.2 Providers shall properly identify and authenticate system users.</td>
<td>Yes</td>
</tr>
<tr>
<td>5.3.3 Providers shall limit access to account holder care data on a “need to know” basis</td>
<td>Yes</td>
</tr>
<tr>
<td>5.3.4 Providers shall limit physical access to systems.</td>
<td>Yes</td>
</tr>
<tr>
<td>5.3.5 Providers shall ensure correct and secure operations of information processing.</td>
<td>Yes</td>
</tr>
<tr>
<td>5.3.6 Providers shall develop processes to ensure that all transactions and user activities are logged with appropriate audit trails.</td>
<td>Yes</td>
</tr>
<tr>
<td>5.3.7 Providers shall regularly test security systems and processes.</td>
<td>Yes</td>
</tr>
<tr>
<td>5.3.8 Providers shall ensure continuity of information security.</td>
<td>Yes</td>
</tr>
<tr>
<td>5.3.9 Providers shall develop a process to identify, address, and monitor security incidents and security-related complaints.</td>
<td>Yes</td>
</tr>
<tr>
<td>5.3.10 Providers shall develop risk-based policies and measures for fraud detection and prevention</td>
<td>Yes</td>
</tr>
<tr>
<td>GSMA Requirement</td>
<td>Compliant</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>6.1.1 Providers shall ensure that users are provided with clear, prominent, and</td>
<td>Yes</td>
</tr>
<tr>
<td>timely information regarding fees and terms and conditions.</td>
<td></td>
</tr>
<tr>
<td>6.2.1 Providers shall educate account holder care representatives on how to use</td>
<td>Yes</td>
</tr>
<tr>
<td>mobile money services safely</td>
<td></td>
</tr>
<tr>
<td>7.1.1 Providers shall develop Account Holder Care complaint policies and procedures.</td>
<td>Yes</td>
</tr>
<tr>
<td>7.1.2 Providers shall inform MoMo Account Holder Care representatives of the</td>
<td>Yes</td>
</tr>
<tr>
<td>existence of the providers Customer Care complaint policies and procedures</td>
<td></td>
</tr>
<tr>
<td>7.2.1 Providers shall provide an appropriate mechanism for user caresaccount</td>
<td>Yes</td>
</tr>
<tr>
<td>holders to address questions and problems.</td>
<td></td>
</tr>
<tr>
<td>7.3.1 Providers shall specify how disputes can be resolved if internal resolution</td>
<td>Yes</td>
</tr>
<tr>
<td>fails</td>
<td></td>
</tr>
<tr>
<td>8.1.1 Providers shall comply with good practices and relevant regulations</td>
<td>Yes</td>
</tr>
<tr>
<td>governing end user data privacy</td>
<td></td>
</tr>
<tr>
<td>8.2.1 Providers shall ensure that users are provided with clear, prominent, and</td>
<td>Yes</td>
</tr>
<tr>
<td>timely information regarding their data privacy practices.</td>
<td></td>
</tr>
<tr>
<td>8.3.1 Providers shall ensure that account holders are informed of their rights</td>
<td>Yes</td>
</tr>
<tr>
<td>and have opportunities to exercise meaningful choice and control over their</td>
<td></td>
</tr>
<tr>
<td>personal information.</td>
<td></td>
</tr>
<tr>
<td>8.3.2 Providers shall seek MoMo Account Holders consent for any changes that</td>
<td>Yes</td>
</tr>
<tr>
<td>materially affect the privacy of their personal information.</td>
<td></td>
</tr>
<tr>
<td>8.4.1 Providers shall limit the personal information that is collected from</td>
<td>Yes</td>
</tr>
<tr>
<td>account holders and is retained, used, or shared.</td>
<td></td>
</tr>
</tbody>
</table>

With specific relevance to the question of interfaces with other Providers, it is important to remember that all participants in MoMo transactions are expected to have accounts in the MoMo system. Since this is the case, every participant in a MoMo transaction will already have been through MoMo’s AML, KYC and CFT procedures. There is no case in which MoMo will rely on the assurances of another Provider about the bona fides of its account holders, and the question of the quality of that reliance therefore does not arise.

With regard to the quality of interfaces with other Providers, MoMo is committed to following the emerging standards proposed under the GSMA’s Global Certification Forum http://www.gsma.com/network2020/accreditation-and-certification/. This defines the structure of testing that needs to be followed by an API provider, and provides a route to certification. MoMo will work with Providers to ensure that these guidelines are appropriate and that, where appropriate, GSMA certification is obtained.
4. **SPEED (FAST)**

**Self-assessed rating:**

<table>
<thead>
<tr>
<th>Effectiveness Criteria</th>
<th>Effectiveness Criteria Self-Assessment (Check One)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criteria Name</td>
<td># Consideration Name</td>
<td>VE</td>
</tr>
<tr>
<td>Speed (Fast) F.1</td>
<td>Fast approval</td>
<td>✓</td>
</tr>
<tr>
<td>Speed (Fast) F.2</td>
<td>Fast clearing</td>
<td>✓</td>
</tr>
<tr>
<td>Speed (Fast) F.3</td>
<td>Fast availability of good funds to payee</td>
<td>✓</td>
</tr>
<tr>
<td>Speed (Fast) F.4</td>
<td>Fast settlement among depository institutions and regulated non-bank account providers</td>
<td>✓</td>
</tr>
<tr>
<td>Speed (Fast) F.5</td>
<td>Prompt visibility of payment status</td>
<td>✓</td>
</tr>
</tbody>
</table>

1. **Justification for F.1 Fast approval:**

The Solution executes transactions between entities which all have financial presences in the form of accounts within the system. All individual subscribers in the system are required to keep a positive credit balance on their accounts. Given that this is the case, authorisation processes are executed within the Solution for all types of transaction which involve the transfer of funds, with the exception of reconciliation transactions. For transactions other than reconciliation transactions, authorisation will normally be given in sub-second elapsed times, where normally means: in 99.9% of cases.

2. **Justification for F.2 Fast Clearing:**

For the reasons given above, clearing of funds takes place in sub-second elapsed times in the majority of cases. The exception to this is situations where a response is required from a Provider before the funds can be cleared. For instance, when a subscriber is paying a utility bill, the transaction definition may stipulate that the utility Provider must confirm that the payment has been registered with their internal system before the transaction is cleared in the Solution. In these cases, response times can be enforced by setting time-outs on the transaction step, but nothing is gained by setting time-out values shorter than can reliably be achieved by the system interface. Actual response times are the responsibility of the interface between the Solution and the Provider, and cannot therefore be part of the commitment here.
3. Justification for F.3 Fast availability of good funds to payee:

Once a transaction is finalised by the system, funds are immediately available to the creditor. If we measure from the point at which a subscriber confirms their intention to transact by pressing the “confirm” button on their handset or by initiating a transaction via a web interface, then typical elapsed times until the funds are available in the creditor’s account are less than one second. During this period, the funds are reserved in the debtor’s account and cannot be spent elsewhere.

An exception to this rule is the situation where confirmation must be received from an external system before the transaction is completed – for instance, in the payment of a utility bill, where the MoMo system may be configured to wait for a confirmation that the payment has been registered (not completed) in the utility’s internal system. In these cases, the funds are reserved in the debtor’s account and cannot be spent elsewhere; but they are not transferred to the creditor’s account in the MoMo system until the external Provide responds. In such cases, MoMo is dependent on the efficient operation of the Provider’s system. MoMo will attempt to constrain Provider responses by the use of SLAs, but our experience is that this is not always possible and that, where a Provider is not in fact capable of meeting an SLA requirement, little is gained for MoMo’s account holders by doing anything other than encouraging improvement.

4. Justification for F.4 Fast settlement among depository institutions and regulated non-bank account providers:

[F.4.1-F.4.3]

The Solution offers the following options for settlement between the Solution and the Providers with which it interfaces. Each of these options except the last involves only modifications to the accounts within the Solution and transactions which directly move money between accounts in the Solution and accounts external to the solution which are owned by Providers. Given that this is the case; no credit or liquidity issues arise. The Solution does not rely on credit from Providers in any case.

1. Provider manipulation of accounts within the solution. When a Provider interface is set up, accounts of various kinds (e.g. Commission Account, Float Account, Working Account) are set up for them within the Solution. In addition, the Provider is given an on-line interface to the Solution which allows operators belonging to the Provider to work with their accounts in the Solution. Providers can therefore transfer money into or out of the Solution as required. The Solution can also be configured to send a message to the Provider using a configured message channel if, for instance, the balance in a given account falls below a specified threshold. No reconciliation procedures are required in this case, and it will normally be the case that the Provider will be required (via a configurable rule) not to run a negative balance on some or any of their accounts if they use this option.
2. On-demand reconciliation. The Solution contains facilities to auto-generate a transaction containing a request to the provider to transfer funds into the Provider’s account in the Solution if the balance in the Provider’s account in the Solution falls below a certain level. The level at which the trigger is set and the amount which is transferred can be configured in the Solution. In addition, the Solution contains facilities to trigger transfers between a Provider’s accounts in the Solution (for instance, to transfer an amount from the Float account to the Working account) if the balance in the target account falls below a specified level. The Provider will be notified of these transactions via their preferred messaging channel, which is configurable within the system. In addition, staff at the Provider can view statements of account activity on demand using their web interface. It is also possible to set a rule of the reverse kind, according to which the Solution will automatically initiate a transfer from a Provider’s account in the Solution to the Provider if the balance in one of the Provider’s accounts in the Solution rises above a given level.

3. Periodic reconciliation. In situations where there is significant traffic in both debits and credits between the Solution and a Provider, it may be more convenient to reconcile the financial position between the two at pre-defined intervals. For instance, a loan Provider will be debited for loans made to subscribers, and credited with payments made by subscribers. The Solution provides automated facilities for making reconciliations between the activity recorded by a Provider and the activity recorded by the Solution. This reconciliation is made on a per-transaction basis, where individual transactions in the two systems are matched according to defined (and configurable) rules, with only transactions that cannot be matched saved for manual reconciliation. As a consequence of the reconciliation, the Provider may elect to move money into or out of their accounts in the Solution. The Solution provides for these reconciliations to be undertaken either after a timed period, or on demand via the Provider’s web interface into the Solution.

5. Justification for F.5 Prompt visibility of payment status:

[F.5.1-F.5.2]
When a transaction which involves the movement of money is finalised in the Solution, then the debit party will be notified via their preferred notification channel that their account has been debited with the principal and any charges associated with the transaction. If required, a notification that funds have been reserved can also be sent at the point of approval, but the speed at which transactions are completed in the Solution normally makes this step unnecessary.

At the same time, the creditor is notified via their preferred notification channel that their account has been credited with the principal and that the funds are available to them.

The Solution can be configured to send notifications to the beneficiaries of charges, but the speed of transaction completion and the low charges associated with the solution mean that this option is not normally used.
In addition, individual subscribers can always check their credit balance on all their accounts using any of the device channels supported by the system.
5. Legal Framework

### Self-assessed rating:

<table>
<thead>
<tr>
<th>Effectiveness Criteria</th>
<th>Effectiveness Criteria Self-Assessment (Check One)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criteria Name</td>
<td>#</td>
<td>Consideration Name</td>
</tr>
<tr>
<td>Legal Framework</td>
<td>L.1</td>
<td>Legal framework</td>
</tr>
<tr>
<td>Legal Framework</td>
<td>L.2</td>
<td>Payment system rules</td>
</tr>
<tr>
<td>Legal Framework</td>
<td>L.3</td>
<td>Consumer protections</td>
</tr>
<tr>
<td>Legal Framework</td>
<td>L.4</td>
<td>Data privacy</td>
</tr>
<tr>
<td>Legal Framework</td>
<td>L.5</td>
<td>Intellectual property</td>
</tr>
</tbody>
</table>

### 1. Justification for L.1 Legal Framework

The legal framework will be established by the Terms and Conditions (“T&Cs”) governing all end users. It is contemplated that all end users will maintain a MoMo account with the MoMo Entity for the sending and receiving of payments through the MoMo system, and all end users will agree through a legally binding process to the T&Cs during the establishment of their MoMo account.

In addition, U.S. end users will be subject to applicable U.S. law with which their T&Cs will conform. For U.S. end users who are individuals establishing their MoMo account primarily for personal, family or household purposes, this applicable law would include the federal Electronic Fund Transfer Act (15 USC 1693 et seq.) (the “EFTA”) and Consumer Financial Protection Bureau (“CFPB”) Regulation E (12 CFR Part 1005). Transfers between business end users through the MoMo system (B2B) would be subject to Uniform Commercial Code Article 4A as enacted in each state.

The MoMo Entity will be subject to and required to comply with Office of Foreign Asset Control (“OFAC”) requirements and Bank Secrecy Act (the “BSA”) know your customer (“KYC”) and anti-money laundering (“AML”) requirements with respect to its U.S. end users. Compliance with OFAC and BSA requirements are discussed in more detail elsewhere in this submission. The MoMo Entity also will be subject to the Unlawful Internet Gambling Enforcement Act of 2016 (31 USC 5361-5367) (the “UIGEA”) and Federal Reserve Board and Department of Treasury Regulation GG (12 CFR Part 233).
It also is anticipated that, as a multilateral system used for the purpose of clearing, settling and recording payments, the MoMo system and the MoMo Entity will be subject to the Federal Reserve Policy Statement on Payment System Risk (F.R.R.S. V. 9-1000 et seq.) (the “Policy Statement”). Accordingly, it is anticipated that the MoMo system and the MoMo Entity would be subject to the requirements of Part I.C of this Policy Statement. If and when the MoMo system expects to settle a daily aggregate gross value of U.S. dollar-denominated transactions exceeding $5 billion on any day during the next 12 month period, the MoMo system and MoMo Entity also would be subject to Part I.B of this Policy Statement. In the event the MoMo Entity is permitted to maintain a Federal Reserve Bank account, either because of its enabling legislation discussed elsewhere in this submission or because it is a depository institution, it also would be subject to Part II of this Policy Statement.

Other U.S. laws and regulations that would apply to the solution will depend on the nature of the MoMo Entity. If the MoMo Entity is created pursuant to new enabling legislation, it is anticipated that this enabling legislation would designate additional U.S. laws and regulations to which the MoMo Entity would be subject. If the MoMo Entity is a depository institution, then the MoMo Entity and the MoMo account would be subject to the federal Truth in Savings Act (12 USC 3201 et seq.) (the “TISA”) and CFPB Regulation DD (12 CFR Part 1030), and the Expedited Funds Availability Act (12 USC 4001-4010) (the “EFAA”) and CFPB and Federal Reserve Board Regulation CC (12 CFR Part 229). If the MoMo Entity is a state licensed money transmitter, it would be subject to the money transmission and other laws of the states in which it is licensed, as well as the federal laws governing money services businesses including the prepaid access rule of the Financial Crimes Enforcement Network of the U.S. Department of Treasury (FinCEN).

Whether the MoMo accounts will be eligible for Federal Deposit Insurance Corporation (FDIC) deposit insurance also will depend on the nature of the MoMo Entity. If the MoMo Entity is created by new enabling legislation, it is anticipated that the enabling legislation would address whether the MoMo accounts are eligible for FDIC deposit insurance. If the MoMo Entity is a depository institution, then it would be eligible for FDIC deposit insurance. If the MoMo Entity is a state licensed money transmitter, then it would not be eligible for FDIC deposit insurance.

The supervision and examination of the MoMo Entity also will depend on the nature of the MoMo Entity. If the MoMo Entity is created pursuant to new enabling legislation, it is anticipated that the enabling legislation would designate federal and/or state agencies which would have supervisory and examination authority with respect to the MoMo Entity. If the MoMo Entity is a depository institution, the MoMo Entity would be subject to the examination and supervision of the federal bank regulatory agencies with jurisdiction over the MoMo Entity. For example, if the MoMo Entity were a state-chartered member bank, the MoMo Entity would be subject to the examination and supervision of the Federal Reserve, FDIC and banking department of the chartering state. If the MoMo Entity is a state licensed money transmitter, it would be subject to the examination and supervision of the states in which it is licensed, and also under the federal laws governing money services businesses the examination and supervision of FinCEN and the Internal Revenue Service (IRS). However, regardless of the nature of the MoMo Entity, as a provider of a “consumer financial product or service,” the
MoMo Entity would be subject to the examination and supervision of the CFPB and subject to the examination and supervision of the Federal Reserve under the Policy Statement. Other applicable U.S. laws are discussed below in the context of other of the legal framework criteria. It is anticipated that the T&Cs will be comprehensive and there will be no gaps in legal sources with respect to the Legal Framework for the solution.

2. Justification for L.2 Payment System Rules:

As discussed above in Criteria L1, each end user will agree with the MoMo Entity to T&Cs governing the end user’s MoMo account used by the end user to send and receive payments through the MoMo system. These T&Cs will include requirements, standards/protocols and procedures that govern the rights and obligations of the end user, the MoMo Entity and any third party agent or service provider used by the MoMo Entity to provide the MoMo service. Without limiting the generality of the preceding sentence, these T&Cs will include: the process the MoMo Entity will use to authenticate end users, payments and messages connected to payments; the legal responsibilities of the MoMo Entity to end users; payment initiation, authorization and termination of that authorization; cancellation of payments; delayed and failed payments; payment finality and settlement, including availability, of funds to end users; timing of sending and receipt of payments; recordkeeping and legal import of records; and error resolution for payment disputes between end users and the MoMo Entity and between end users. Many of the foregoing are addressed in more detail elsewhere in this submission.

3. Justification for L.3 Consumer protections:

As discussed above in Criteria L1, regardless of the nature of the MoMo Entity, the MoMo Entity and the end users will be subject to the EFTA and Regulation E. The T&Cs accordingly will provide end users rights relative to the MoMo Entity in accordance with these laws and regulations, including liability protection in the event of unauthorized, fraudulent or erroneous payments and error resolution procedures for disputes, as required under the EFTA/Regulation E. The MoMo Entity also will be able to implement through the T&Cs any additional consumer protections it determines to provide end users beyond those required by the applicable laws and regulations discussed above.

4. Justification for L.4 Data Privacy:

Regardless of the nature of the MoMo Entity, the MoMo Entity will be subject to the Gramm-Leach-Bliley Act (15 USC 6801 et seq.) (the “GLB Act”). If the MoMo Entity is a depository institution or the MoMo Entity enabling legislation so provides, the MoMo Entity would be subject to the GLB Act implementing regulations of the CFPB Regulation P (12 CFR Part 1016). If the MoMo Entity is not subject to Regulation P, it would be subject to the GLB Act implementing regulations of the Federal Trade Commission (16 CFR Part 313).
End users will accordingly receive a privacy policy from the MoMo Entity which describes the end user information that will be collected by the MoMo Entity and how that information will be used and shared by the MoMo Entity. The MoMo Entity will be subject to the limitations on use and sharing of user non-public personal information, including opt-out requirements, prescribed in the GLB Act and the applicable implementing regulations. The MoMo Entity also will be subject to the requirements promulgated under the GLB Act that covered financial institutions have in place a written information security program designed to ensure the security and confidentiality of customer records, protect against any anticipated threats or hazards to the security of such records, and protect against the unauthorized access or use of such records or information in ways that could result in substantial harm or inconvenience to customers (e.g., 16 CFR Part 314). The MoMo Entity also will be subject to state data breach law requirements, as well as any requirements of their applicable federal or state regulators (see above), including any applicable requirements to notify end users of actual or suspected unauthorized access or use of their personal information.

5. Justification for L.5 Intellectual property:

It is anticipated that the MoMo Entity will undertake a due diligence review of potentially applicable third party intellectual property and obtain all possible intellectual property protection for the MoMo system, including licensing any applicable third party intellectual property and obtaining to the maximum extent possible patent, trademark, copyright, trade secret and other intellectual property protection for the MoMo system. It also is anticipated that the MoMo Entity will pursue any third party infringing on its intellectual property, in part to protect end users from any third party intellectual property claims. The MoMo Entity also will consider including in the T&Cs an intellectual property indemnification for end users.
6. Governance

Self-assessed rating:

<table>
<thead>
<tr>
<th>Effectiveness Criteria</th>
<th>Effectiveness Criteria Self-Assessment (Check One)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Criteria Name</strong></td>
<td><strong>Consideration Name</strong></td>
<td>VE</td>
</tr>
<tr>
<td>Governance</td>
<td>G.1 Effective governance</td>
<td>✓</td>
</tr>
<tr>
<td>Governance</td>
<td>G.2 Inclusive governance</td>
<td>✓</td>
</tr>
</tbody>
</table>

1. Justification for G.1 Effective Governance

It is anticipated that the identity of the ownership, board of directors and officers of the MoMo Entity will be transparent and publicly available. It also is anticipated that the MoMo Entity will establish a Committee to develop, implement and amend from time to time the T&Cs, subject to approval by the MoMo Entity’s board of directors or its delegate.

2. Justification for G.2 Inclusive Governance

It is anticipated that the Committee responsible for the T&Cs discussed in Criteria G1 will include one or more User representatives. The MoMo Entity also will employ or retain expert subject matter counsel to ensure that the T&Cs conform to the applicable U.S. law discussed elsewhere in this submission. The Committee also will be authorized to establish one or more Advisory Groups comprised of end users and/or other stakeholders to advise the Committee on matters relating to the T&Cs.
## APPENDICES

## GLOSSARY

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transaction</td>
<td>The process of resolving the entities within a financial transaction (principle and charge parties), application of business rules, AML checks for prohibited parties and the reservation of funds to support the transaction. The transaction is in a “Pending” state at the successful completion of this process, otherwise it is declined.</td>
</tr>
<tr>
<td>Authorisation</td>
<td>The process of committing the reserved funds, or reverting them in the case of an invalid completion. Once finalised a transaction is immutable.</td>
</tr>
<tr>
<td>Finalisation</td>
<td>The use of the authorisation and finalisation steps allows for the transaction to involve multiple parties and potentially obtain multiple confirmations before committing the transaction. This process ensures financial integrity and resilience to long running processes.</td>
</tr>
<tr>
<td>Multi-stage</td>
<td></td>
</tr>
<tr>
<td>Cash-Out</td>
<td>The act of cashing out, withdrawing, cash from the system. Typically, by an Account Holder (business or individual) via an Agent of the service.</td>
</tr>
<tr>
<td>Cash-In</td>
<td>The act of cashing in, deposit, put money in the system. Typically, by an Account Holder (business or individual) via an Agent of the service, Org’s Bank.</td>
</tr>
<tr>
<td>Agent</td>
<td>An Account Holder (business or individual) that is contracted to facilitate transactions for Account Holders.</td>
</tr>
<tr>
<td>Agent Assistant</td>
<td>Agent's employee who is allowed to perform transaction on behalf of that agent.</td>
</tr>
<tr>
<td>Disbursement</td>
<td>An organisation (Government, Business Customer or NGO’s) who distribute payments to designated population</td>
</tr>
<tr>
<td>Organisation</td>
<td></td>
</tr>
<tr>
<td>MNO</td>
<td>Mobile Network Operator</td>
</tr>
<tr>
<td>B4P</td>
<td>Banking For People is the MoMo propriety technology platform, this delivers a highly scalable and resilient mobile money platform for implementation of mobile money services.</td>
</tr>
</tbody>
</table>
**BUSINESS PROCESS LIST**

To ensure that service is delivered, the following are indicative of the range of business processes implemented within the operating company to manage and operate a MoMo service.

<table>
<thead>
<tr>
<th>Operating Processes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manage Agent Network (&quot;Distribution&quot;)</td>
</tr>
<tr>
<td>Plan Agent Network Partner requirements</td>
</tr>
<tr>
<td>Manage Agent Network Partner applications</td>
</tr>
<tr>
<td>Select Agent Network partners</td>
</tr>
<tr>
<td>Open Agent Network Partner Accounts</td>
</tr>
<tr>
<td>Agent Application Documentation Archiving</td>
</tr>
<tr>
<td>Onboarding &amp; Training Agent Network partners and alliances</td>
</tr>
<tr>
<td>Manage Agent Recruitment, Training &amp; Management salesforce (field team)</td>
</tr>
<tr>
<td>Field Visits via Agent Salesforce</td>
</tr>
<tr>
<td>Run Agent Education Awareness Events</td>
</tr>
<tr>
<td>Manage Agent Self Service Portal</td>
</tr>
<tr>
<td>Agent Network Account Administration</td>
</tr>
<tr>
<td>Agent Network Financial Operational Support</td>
</tr>
<tr>
<td>Agent Network Outlet Operational Support</td>
</tr>
<tr>
<td>Agent Network Liquidity Management</td>
</tr>
<tr>
<td>Assess Agent Network performance</td>
</tr>
<tr>
<td>Agent Monitoring &amp; Audit</td>
</tr>
<tr>
<td>Termination</td>
</tr>
<tr>
<td>Manage &amp; Reconcile E-Money</td>
</tr>
<tr>
<td>Master Account Bank Onboarding</td>
</tr>
<tr>
<td>Master Account Bank Relationship Management</td>
</tr>
<tr>
<td>Perform Bank Transaction Reconciliation</td>
</tr>
<tr>
<td>Transfer funds between Master Accounts</td>
</tr>
<tr>
<td>Process Approved EFT Withdrawals</td>
</tr>
<tr>
<td>Reconcile Interest, Bank Charges, Tax Entries, Bank Correcting Entries</td>
</tr>
<tr>
<td>Perform Bank Balance Reconciliation Snapshot</td>
</tr>
<tr>
<td>Audit/Monitor employee access to internet banking &amp; E-Money management functionality</td>
</tr>
<tr>
<td>Market and Sell Products and Services - NON MTO SPECIFIC</td>
</tr>
<tr>
<td>Develop marketing strategy</td>
</tr>
<tr>
<td>Develop sales strategy</td>
</tr>
<tr>
<td>Develop and manage marketing plans</td>
</tr>
<tr>
<td>Develop and manage sales plans</td>
</tr>
<tr>
<td>Manage sales partners and alliances</td>
</tr>
<tr>
<td>Manage logistics and warehousing</td>
</tr>
<tr>
<td>Market and Sell Products and Services</td>
</tr>
<tr>
<td>Develop User care Financial Awareness Strategy</td>
</tr>
<tr>
<td>Develop &amp; Implement User Acquisition Strategy</td>
</tr>
<tr>
<td>Individual Registration</td>
</tr>
<tr>
<td>Individual KYC Documentation Management</td>
</tr>
<tr>
<td>----------------------------------------</td>
</tr>
<tr>
<td>Manage Business User/Partner applications</td>
</tr>
<tr>
<td>Business User Registration</td>
</tr>
<tr>
<td>Onboard a Business</td>
</tr>
<tr>
<td>Business KYC &amp; Contract Documentation Archiving</td>
</tr>
<tr>
<td>Business User/Partner Monitoring &amp; Audit</td>
</tr>
<tr>
<td>Individual User Monitoring &amp; Audit</td>
</tr>
<tr>
<td>Business User Account Administration</td>
</tr>
<tr>
<td>Business User Finance Queries</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Deliver Products and Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Configuration</td>
</tr>
<tr>
<td>Service Level Management</td>
</tr>
<tr>
<td>Manage Transaction Flow</td>
</tr>
<tr>
<td>Deliver mobile money services to businesses and agents</td>
</tr>
<tr>
<td>Deliver Mobile Money services to registered on-net individuals</td>
</tr>
<tr>
<td>Deliver OTC mobile money services via agents</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Manage User care Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non MTO Specific</td>
</tr>
<tr>
<td>User care Care Center - Inbound</td>
</tr>
<tr>
<td>User care Care - Face to Face</td>
</tr>
<tr>
<td>MoMo WebPOS (&quot;User care Self Service)</td>
</tr>
<tr>
<td>User care Care - Outbound</td>
</tr>
<tr>
<td>Escalation: Tier 2 Support</td>
</tr>
<tr>
<td>User care Care Employee Management</td>
</tr>
<tr>
<td>Assure service (fault escalation &amp; resolution)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Manage Agent &amp; Merchant Outlet Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authenticate caller identity</td>
</tr>
<tr>
<td>Employee PIN Management</td>
</tr>
<tr>
<td>Balance &amp; Transaction Queries</td>
</tr>
<tr>
<td>Support Commission Queries</td>
</tr>
<tr>
<td>Transaction Reversals (Deposit Cash, Withdraw Cash)</td>
</tr>
<tr>
<td>Fraud Reporting/Suspicious Activity reporting</td>
</tr>
<tr>
<td>Query on System Outage/Network Issues</td>
</tr>
<tr>
<td>Manage Complaints</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Termination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Termination Instruction Initiation</td>
</tr>
<tr>
<td>Authenticate Instruction</td>
</tr>
<tr>
<td>Inform Business/User care</td>
</tr>
<tr>
<td>Business Closure Activity</td>
</tr>
<tr>
<td>Remove Employee</td>
</tr>
<tr>
<td>Close Financial Account(s)</td>
</tr>
<tr>
<td>Access Closed Account Data</td>
</tr>
<tr>
<td>Archive Closed Accounts</td>
</tr>
<tr>
<td>Access Archived Account Data</td>
</tr>
<tr>
<td>Claim dormant funds not yet received</td>
</tr>
<tr>
<td>Monitor Dormant Funds Account Activity</td>
</tr>
<tr>
<td>---------------------------------------</td>
</tr>
<tr>
<td><strong>Billing, Revenue &amp; Commission Management &amp; Reconciliation (&quot;Manage Financial Services&quot;)</strong></td>
</tr>
<tr>
<td>Banking Partners - Settlement</td>
</tr>
<tr>
<td>C2B/Merchants - Settlement</td>
</tr>
<tr>
<td>Domestic Interoperability - Settlement</td>
</tr>
<tr>
<td>International Remittance - Settlement</td>
</tr>
<tr>
<td>MoMo Department Requires B2C Facility</td>
</tr>
<tr>
<td>MoMo Contract Bill Payment</td>
</tr>
<tr>
<td>MoMo Airtime Purchase (any network, self or other)</td>
</tr>
<tr>
<td>Manage carrier accounting</td>
</tr>
<tr>
<td>Perform MTO revenue &amp; cost accounting</td>
</tr>
<tr>
<td>Net Revenue Settlement &amp; Withdrawal from Master Account</td>
</tr>
<tr>
<td>Manage management accounting</td>
</tr>
<tr>
<td>Perform cost accounting and control</td>
</tr>
<tr>
<td><strong>MoMo as Business User cares of MTO</strong></td>
</tr>
<tr>
<td>MoMo Promotions</td>
</tr>
<tr>
<td>MoMo Salary/Expenses/Allowance Disbursement</td>
</tr>
</tbody>
</table>

**Management & Support Services - Priority 1**

<table>
<thead>
<tr>
<th><strong>MTO: Manage Employee and 3rd Party System Users</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>VET MTO Candidates</td>
</tr>
<tr>
<td>Onboard New Employee</td>
</tr>
<tr>
<td>Grant Live System Access</td>
</tr>
<tr>
<td>Promote Existing Employee</td>
</tr>
<tr>
<td>Remove System Access</td>
</tr>
<tr>
<td>Reinstate Suspended access</td>
</tr>
<tr>
<td>Change registered user details</td>
</tr>
<tr>
<td>Unlock a locked account</td>
</tr>
<tr>
<td>Reset Forgotten Password</td>
</tr>
<tr>
<td>Change Password</td>
</tr>
<tr>
<td>Audit System Access Activity</td>
</tr>
<tr>
<td>Manage Staff Training</td>
</tr>
<tr>
<td>Third Party Training</td>
</tr>
</tbody>
</table>

**Manage Risk, Compliance, Remediation, Resiliency**

| Manage enterprise risk |
| Manage compliance |
| Manage remediation efforts |
| Manage business resiliency |

**Acquire & Manage Assets**

<p>| Buy Test handsets |
| Create test Accounts on Live System |
| Allocate test funds on Live System |
| Appoint new Tester |
| Assign additional handset (user care or till) for tester |
| Tester Leaves |</p>
<table>
<thead>
<tr>
<th>Monthly recon of all test accounts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test commission Roll-up</td>
</tr>
<tr>
<td>Develop &amp; Manage Human Capital</td>
</tr>
<tr>
<td>Develop &amp; Manage Products &amp; Services</td>
</tr>
<tr>
<td>Management &amp; Support Services - Priority 2</td>
</tr>
<tr>
<td>Develop Vision &amp; Strategy</td>
</tr>
<tr>
<td>Manage Information Technology</td>
</tr>
<tr>
<td>Manage External Relationships</td>
</tr>
<tr>
<td>Develop &amp; Manage Business Capabilities</td>
</tr>
<tr>
<td>Manage Procurement &amp; Supply Chain</td>
</tr>
</tbody>
</table>
## RULES (Transaction, AML, Charges)

<table>
<thead>
<tr>
<th>Type</th>
<th>Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transaction Type</strong></td>
<td>Entities have to be enabled to request a transaction by creating relationship between entities. The relationship establish who is the initiator of transaction and who is the recipient (e.g. assistant, account holder)</td>
</tr>
<tr>
<td><strong>Duplicate Requests</strong></td>
<td>Monitoring of duplicate requests</td>
</tr>
<tr>
<td><strong>Transaction Amount</strong></td>
<td>Higher and lower amount can be configured for each transaction type. If transaction amount is not in the defined range, it will be declined</td>
</tr>
<tr>
<td></td>
<td>Maximum daily value restricts accumulative amount that a transaction type can be requested for each user care in a day. When the amount passes the maximum daily transactions following transaction are declined</td>
</tr>
<tr>
<td></td>
<td>Maximum monthly value restricts accumulative amount that a transaction type can be requested for each user care in a month. When the amount passes the maximum monthly transactions following transaction are declined</td>
</tr>
<tr>
<td></td>
<td>Higher and lower account balance can be configured for each account type. If the account balance is not in the configured range all transactions affecting the account will be declined</td>
</tr>
<tr>
<td></td>
<td>Maximum value between entities can be configured for each transaction type. When the amount passed the maximum daily transactions between same entities following transaction are declined</td>
</tr>
<tr>
<td><strong>AML</strong></td>
<td>System allows to create list to identify specific groups of people or enterprise (e.g. Black List, PEP List, ONU List). A list is configured to allow or not people to request transaction to register as an account holder, cash in and/or cash out from MoMo account base on the identification.</td>
</tr>
<tr>
<td></td>
<td>List can be configured to allow people to transact but are being reported</td>
</tr>
<tr>
<td></td>
<td>People with names that cross match with someone related to a specific list are allowed to transact, but will reported</td>
</tr>
<tr>
<td></td>
<td>People related to a list will be restricted as configured on list while current date is between valid period for each individual</td>
</tr>
<tr>
<td></td>
<td>If a person is related to more than one list it will be evaluated individually for each list and transaction will be affected for all applicable restriction</td>
</tr>
<tr>
<td><strong>Charges</strong></td>
<td>Charge according transaction amount ranges and fixed or a percentage of transaction</td>
</tr>
<tr>
<td></td>
<td>Charge not applicable for withdrawal when P2P, G2P and B2P credit count upper than 0 and the transaction amount up to accumulated amount</td>
</tr>
<tr>
<td></td>
<td>More than one charge can be applied to transaction according to the configuration.</td>
</tr>
<tr>
<td></td>
<td>Charge can be applied according the agent network</td>
</tr>
</tbody>
</table>
ADDENDUM TO EXISTING PROPOSAL MOBILE MONEY CORP.

APPENDIX A

Responses to Questions from the Preliminary Assessment

26 August 2016

This document contains MoMo’s responses to the questions raised by the preliminary assessment of the MoMo response to the QIAT RFP. These questions were raised in Appendix A of the Preliminary Assessment.

This document has the following structure. First, we repeat the specific questions raised in Appendix A of the Preliminary Assessment, together with some more general questions raised in the assessment. These are shown in Section 1 below. Second, we give our responses to the questions in a number of sections. In some cases, specific questions raised as part of the Preliminary Assessment seemed to us to be related to each other, and therefore to be better answered by longer and more structured narratives. These narratives are normally shown as sub-sections of this document, except where they seemed to us to be better shown in different forms. In other cases, the questions were more or less self-contained; these questions have been answered as sub-sections of a single section of the document which is given in Section 2 below.

In all cases, we give references from the specific questions in Section 1 below, either to the place in this document where that question is answered or to the separate document in which they are answered.

1 Questions

The following questions from the Preliminary Assessment are answered in this document:

1.1 Questions from the body of the Preliminary Assessment

The following point was raised in the body of the Preliminary Assessment: “The solution’s success is also heavily reliant on building out a large agent network (450,000 locations in five years). The solution does not outline the details of how these agents would be selected, nor a timeline describing growth of the network. This network will be required to support unbanked or underbanked end users. There are concerns about the capability of these agents to authorize end users at enrolment and in the deposit and withdrawal of funds to and from the MoMo system. Training this large network and monitoring and managing performance will be challenging.”

This question is answered in Section 2 below.

1.2 Questions from Appendix A

The following questions were given in Appendix A of the Preliminary Assessment:
APPENDIX A: QUESTIONS FOR PROPOSERS

Ubiquity

U.1.4: What will be your target price point when working with cash-in/cash-out agents? How will you keep that fee level below bank transaction fees (enabling $5 USD transactions)?

   This question is answered in Section 2.4 below

U.1.6: How does an end user without a cell phone participate in all use cases?

   There are differences in the ways in which users can authenticate on different use cases, depending on the authentication methods supported by those devices. For instance, feature phones do not support biometric authentication, whereas smart phones may. The MoMo solution solves this problem by allowing account holders to choose multiple methods of authentication, and then allowing them to choose the method of authentication from among those methods which are available on the channel through which they are attaching to the system. If the account holder has not selected any authentication methods which are available on the device from which they are authenticating, then they will see a message to this effect and will not be able to authenticate.

   Once an account holder is authenticated, all use cases are supported. Our menu configuration process automatically produces versions which support all available channels.

U.1.6: What aliases other than MSISDN does the Solution support?

   This question is answered in the presentation concerning the user registration process that is appended to this response.

U.2.2: Will the Solution support identifiers other than cell phone numbers?

   This question is answered in the presentation concerning the user registration process that is appended to this response.

U.3.2: How does the solution ensure compliance with consumer protection regulations and commercial law?

   This question is answered in Section 5.14 below.

U.3.4: Does the solution support all the same features on the Internet channel as on the mobile channel? 

   Yes, subject to the capacity of the internet channel to support authentication methods. For instance, some biometric authentication methods may not be available on the internet channel. All functional aspects of the system are available on all channels.

U.3.4: Does the phone provide any additional authorization capabilities that aren’t provided by the PC?

   This question is answered in the presentation concerning the user registration process that is appended to this response.

U.3.5: What is the process for an end user to cancel a payment? A preauthorized payment?

   This question is answered in Section 5.10 below.

U.3.5: Please provide more details on the resolution process between two parties?

   This question is answered in Section 5.3 below
U.3.5: What will be the major elements of your Account Holder Terms and Conditions for error resolution?

The transfer reversion section says that completed transfers can be reversed solely by mutual consent of the sender and the recipient by calling Customer Service.

When transfers are the result of unlawful activity, the debit party should notify MoMo Customer Service of the complaint. This will be raised with the appropriate authorities, and the process that the authorities determine for this purpose will continue.

The conflict resolution section establishes that any dispute arising between the parties shall be resolved in accordance with local laws and the parties’ obligations as defined in the Terms and Conditions.

It should be noted that this process differs from the chargeback model commonly used by credit and debit card companies, in which disputed funds can be removed directly from an account holder’s account. The reasons for this are given in section 5.7 below.

U.4.1: What contextual data will be included with government payments and business payroll payments so that the end user knows what the payment is for?

This question is answered in Section 5.3 below.

U.4.2: For B2B payments in which all accounts are MoMo accounts, how will the Solution support the provision of contextual data (such as invoice numbers and details that can be populated into proprietary business systems) to support straight-through processing?

This question is answered in Section 3 below. The comments made in that section about interactions with third parties also apply to transactions within the MoMo system.

U.5.2: What is the role of ISO20022 availability/support in the implementation of cross border functionality?

Where we are interacting with a third party to support remittances to another country, and the third party does not have a recognised communications API to support these transactions, then we will propose use of the ISO 20022 standard to support these transfers. This will allow us to interact with third party remittance services in different countries without needing to construct new interfaces, and will also allow the third party to re-use the interface to communicate with other organisations.

U.5.2: How will you handle settlement and compliance for cross border payments?

This question is answered in Section 5.4 below.

U.5.4: How many FX providers do you intend to partner with?

This question is answered in Section 5.5 below.

U.5.4: Please provide any available details of the SLAs that will be in place with FX providers to ensure that payees receive funds from non-MoMo mobile networks in a timely manner.

This question is answered in Section 5.5 below.

U.6: How will the Solution be marketed to banked consumers to increase participation? What are the incentives for them to adopt vs. existing payment methods?

This question is answered in Section 5.7 below.
U.6: What is the value proposition for businesses to adopt this Solution to support B2B payments? This question is answered in Section 5.8 below.

Efficiency

E.1.1: Please describe how the Solution will support competition in the industry, particularly as it relates to third-party services that can be bundled with the Solution? This question is answered in Section 3 below.

E.1.4: What will be the participation requirements for business end users? This question is answered in Section 3 below.

E.2.1: How will the open API work? How will external entities access the core of the Solution? This question is answered in Section 3 below.

E.2.3: Will the Solution require third-party providers to disclose fees and conditions as a prerequisite to connect and introduce new features? This question is answered in Section 3.4 below.

E.3.1: Please provide more details regarding the plan to secure necessary funding to roll out the Solution. MoMo has been fully funded for the last six years, and has achieved the following results:

- New legislation in two countries creating a new Transactional DI model.
- Developed a proprietary software based on its unique Business Model.
- Deployed its Proof of Concept operations in El Salvador.

- MoMo's financial backers are committed to a continued deployment during the next 2 years of its operations in the US and in 3 other countries.

E.4.1: Please provide more details regarding message translation, including how and where translation from a proprietary format to a commercial format will occur. This question is answered in Section 3 below.

E.6.3: How was the 25% redundancy figure selected? Will this level of redundancy adequately support B2B and B2P volumes? This question is answered in Section 5.13 below.

E.6.3: How do you plan to conduct stress testing on the solution’s ability to scale? This question is answered in Section 5.2 below.

E.7.1: Please provide more details on the Solution’s dispute resolution process. This question is answered in Section 5.3 below.

E.7.1: Please provide a process flow for issue resolution and identify any areas where SLAs will apply. This question is answered in Section 5.3.1 below.

E.7.3: Will the system support the aggregation of data to monitor transaction patterns across the Solution in real time? If not, would you consider engaging a third party to deliver this service in real time?
Operational analysis is currently carried out on total transactional throughput overall, and broken down by transaction types and transaction type groups.

Transactional data is automatically extracted from the application’s main data store into a separate data store which is available for subsequent analysis.

We will consider engaging a third party to provide these services; a more likely scenario is that we will use third party analysis services to perform our own analysis.

Safety and Security

S.1.3: Please outline the key service requirements and related metrics (SLAs) that you will require of the vendor that hosts the Solution (the proposal references Microsoft Azure)?

This question is dealt with in Section 5.18 below.

S.1.3: What is the penalty for agents who perform a transaction without adequately verifying the end user?

This question is dealt with in Section 5.3 below.

S.1.4: There is a timeout requirement that would necessitate the end user to log in again - is this configurable by the end user? Can the end user set up the app to require a PIN for every transaction rather than for every session?

Yes, the timeout interval is configurable by the end user.

Yes, the end user can configure transactions to require a PIN for each transaction. This is default behaviour for agent assistants.

S.1.5: What is the penalty for agents who open an account that ends up being fraudulent?

Provided the agent has followed the procedures for registering an account holder, no penalty attaches to them. If the agent has failed to follow procedures, the situation is dealt with in consultation with the legal and regulatory authorities.

S.1.5: What are the criteria by which you will evaluate the providers? How do you manage bad actors?

This question is dealt with in Section 3.3 below.

S.1.6: What would be ‘appropriate intervals’ for framework updates as described p128?

Intervals for in-market watch lists are prescribed by the government Compliance Office, which issues updates to the watch lists. Once issued, updated watch lists are validated and loaded onto the system within one week of receipt.

Updates to the watch lists maintained by the UN (ONU list) and the US government (OFAC list) are carried out monthly.

S.2.1: Does the Solution support other authentication methods in addition to PIN (e.g., biometric)?

Yes. This question is dealt with in more detail in the presentation concerning the user registration process that is appended to this response.

S.3.3: Please provide more details regarding the dispute process, including the criteria that will be reviewed to determine whether a disputed payment was made in error and should be returned.
This question is dealt with in Section 5.3 below.

S.3.3: Please provide details of any SLAs for dispute resolution.

S.3.3: This question is dealt with in Section 5.3.2 below

S.4.2: How will the Solution manage institutional credit risk for business end users that hold major MoMo accounts?

The expectation is that MoMo’s control accounts will be hosted at the Federal Reserve. MoMo does not make any use of funds deposited into this account by account holders. The funds in this account cover all liabilities to depositors, and the contents of the account are secured against any creditors of the MoMo business. There is therefore no credit risk to MoMo’s account holders.

S.4.2: What will happen in the event an end user wishes to initiate a transaction that exceeds the value loaded in a MoMo account? Is there a capability or requirement to support real time transfers from legacy bank accounts?

This question is dealt with in Section 5.11 below

S.5.1: What are the rules for dispute management defined in the MoMo Account User Care Service Department?

S.5.1: This question is dealt with in Section 5.3 below.

S.5.1: Please provide a detailed description of the dispute management process, including how each party to a transaction can initiate a dispute, criteria to determine the outcome of a dispute, and any SLAs related to resolution?

S.5.1: This question is dealt with in Section 5.3 below

S.5.2: What is the status of the establishment of the policies to support S.5.2, clarifying how payers can comply with consumer protection laws related to error resolution and fraudulent or otherwise unauthorized payments?

S.5.2: This question is dealt with in Section 5.14 below

S.6.2: Please provide more details about any external parties with which the Solution will share transaction data.

S.6.2: This question is dealt with in Section 5.19 below.

S.6.2: How will the Solution transmit such transaction data to these external parties?

S.6.2: This question is dealt with in Section 5.19 below.

S.6.3: Please provide more details on how the Solution will support the identification of fraudulent transactions in real time.

S.6.3: This question is dealt with in Section 5.19 below.

S.6.5: Will the Solution provide for different access levels to the fraud sharing mechanism based on stakeholder type (e.g., Payer, FI, regulator)?

Yes. This will be based on the roles assigned to stakeholders.

S.6.6: If a third party is to be engaged as a central authority, what are the requirements that that entity must meet regarding storage, aggregation and sharing of transaction information?

S.7.1: Please provide the process flow and a list of the data elements required for registration at an agent and for registration online.

This question is dealt with in the presentation concerning the user registration process that is appended to this response.

S.7.1: How does the Solution confirm ID+V for users who register online?

This question is dealt with in the presentation concerning the user registration process that is appended to this response.

S.7.1: How does the Solution ensure that handset encryption is sufficient? Will the Solution specify minimum requirements for this?

This question is dealt with in Section 5.20 below.

S.7.1: Is there a roadmap to enhance end user authentication?

This question is dealt with in the presentation concerning the user registration process that is appended to this response.

S.8.2: Please provide further details and assessment of Microsoft Azure’s business continuity and disaster response plans.

This question is dealt with in Section.

S.8.5: Please provide more details on the Solution’s contingency testing schedule.

This question is answered in Section 5.2 below.

S.9.2: Please provide more details regarding the Azure database’s encryption of PII provided during account setup.

This question is answered in Section 5.21 below.

S.10.1: Does the Solution set a maximum account balance?

This question is answered in Section 5.16 below.

S.10.1: Can an end user register for an account online or through a call center? How does the Solution authenticate end users in these channels?

This question is dealt with in the presentation concerning the user registration process that is appended to this response.

S.10.3: Please confirm that the Solution’s end user authentication processes will align with U.S. industry standards (ANSI, ISO, W3C, etc.)

This question is dealt with in the presentation concerning the user registration process that is appended to this response.

S.10.4: Does the Solution support differentiated authentication for individual transactions based on transaction type, value, channel etc.?

In brief, yes. This question is dealt with in more detail in the presentation concerning the user registration process that is appended to this response.
S.10.6: Please provide more details about how the authentication process can be modified to adopt new methods of authentication.

This question is dealt with in the presentation concerning the user registration process that is appended to this response.

S.10.6: How will the Solution adopt or decommission authentication options?

Authentication options are adopted by adding the data type to the system and by specifying its membership of the Authentication Options group. Authentication options are expired technically by expiring all instances of the data type, and then removing the data type from the Authentication Options group. Account holders who are registered for that type of authentication will be notified of the intention to do this in advance using the application’s News function, and will be recommended to sign up to new methods of authentication.

S.11.1: Please provide more details regarding participation requirements for agents. How will MoMo will ensure that they adhere to the rules and requirements related to their roles?

This question is dealt with in Section 2 below.

Fast (Speed)

F.2: How does the Solution implement and support additional approval processes that may be required to support business payments?

This question is answered in Section 5.17 below

F.2: What will be the impact on transaction time of the introduction of any required additional approval processes?

This question is answered in Section 5.17 below

F.2: Does the solution support ‘fast learning’ of transactions involving third-party organizations?

This question is answered in Section 5.17.4 below.

F.3: Must a biller confirm an account for every payment, or only for the first transaction? (See fast learning question above.)

This question is answered in Section 5.17.4 below.

Legal

L.1.2: In L.1.1, the proposer outlines potential options for the "nature of the MoMo entity". Which option does the proposer believe is most likely?

The Federal Reserve Bank may simplify by regulation a Deposit Institute only as a "Transactional DI: "The MoMo Entity" to open and maintain Federal Reserve Accounts, keeping in one of its accounts (Custodial) reserves of 100% of the prepaid transactional deposits. The MoMo entity does not require FDIC insurance. The MoMo entity may negotiate with any Depository Institutions (Preferably Government ones) a service contract where our agents will deposit funds to it: funds to be transferred to the MoMo account at the Federal Reserve using the existing or future settlements system.

Our Proved Solution is a development tool to include 88 million American citizens that are the financial obscurity to the US financial system.
L.1: Is the Fed willing to allow KYC to happen through the MoMo Agent network under the given registration conditions?

The MoMo Entity, as the entity providing the MoMo service to the end user, would be responsible for KYC, as a “Transactional DI”, money transmitter or bank. This is a common arrangement in the United States.

L.2.2: Please describe the process to develop and amend Payment System rules.

This process is described in Section 5.14 below.

L.2.3: Please describe how the Solution will enforce and monitor payment system rules across all participants.

This process is described in Section 5.14 below.

L.3.2: Please provide more details regarding the payment system rules that will support error resolution and consumer claims related to fraudulent transactions, unauthorized payments or errors.

This process is described in Sections 5.14 below and 5.3 below.

L.3.2: Please describe roles and procedures to support error resolution for consumer claims.

This process is described in Section 5.3 below.

L.3.3: Please provide more details about the process required to establish any additional consumer protections that may be required.

This question is answered in Section 5.14 below.

L.4.3: Please provide a process flow for application for each channel (online, call center, agent), including what information is required from the end user. How does the Solution authenticate a new registrant when they enroll remotely?

This question is dealt with in the presentation concerning the user registration process that is appended to this response.

L.4.3: Please provide more details about what end user information the Solution stores to support end user authentication.

This question is dealt with in the presentation concerning the user registration process that is appended to this response.

L.4.4: Please describe how end users can review the personal information that the Solution has stored on their behalf.

This question is answered in Section 5.21 below.

L.4.4: How can end users change their privacy preferences for their PII?

This question is answered in Section 5.21 below.

L.4.5: How will the Solution address data breaches?

This question is answered in Section 5.15 below.

L.5.1: Please provide additional information about due diligence reviews (e.g., timing, areas of inquiry).

MoMo has engaged specialist legal firms in the areas of US Intellectual Property and trademark law. They will be conducting a review to ensure that MoMo’s rights to use all areas of its offering are beyond legal challenge in the US. These reviews will be complete before the MoMo
application launches in the US. This is standard MoMo practice, which has already been successfully completed in El Salvador.

**Governance**

G.1.1: When will more information on the solution’s governance will be available?

**Effective Governance: Criteria G1**

It is anticipated that the identity of the ownership, board of directors and officers of the MoMo Entity will be transparent and publicly available. It also is anticipated that the MoMo Entity will establish a Committee to develop, implement and amend from time to time the T&Cs, subject to approval by the MoMo Entity’s board of directors or its delegate.

G.1.1: Will it be possible for MoMo to leverage governance learnings from the implementation in El Salvador?

We expect to be able to leverage our governance learnings in El Salvador where good governance practices are being developed and implemented as they become necessary.

G.2: When will more information on the solution’s governance will be available?

**Inclusive Governance: Criteria G2**

It is anticipated that the Committee responsible for the T&Cs discussed in Criteria G1 will include one or more User representatives. The MoMo Entity also will employ or retain expert subject matter counsel to ensure that the T&Cs conform to the applicable U.S. law discussed elsewhere in this submission. The Committee also will be authorized to establish one or more Advisory Groups comprised of end users and/or other stakeholders to advise the Committee on matters relating to the T&Cs.

2 Agent Acquisition, Motivation and Retention in the MoMo solution

Successful deployment of the MoMo solution depends on the acquisition and retention of a sufficiently extensive agent network. This section describes how MoMo proposes to roll out a network of agents of sufficient size to support the scale of its proposed operations in the USA, and how it proposes to motivate them and monitor their activities.

The key to MoMo’s business model for agents is its simplicity. It has been designed and evolved to be operable in contexts where businesses as well as account holders may be unbanked, and it therefore allows agents to register, transact and administer simply and effectively, without requiring to, purchase additional equipment or enter into onerous contractual relationships.

2.1 Relationships between account holders and agents in the MoMo system

The focus of the MoMo system is individual account holders: MoMo’s mission is to increase financial inclusion for the unbanked and underbanked. In some parts of the world, this category includes substantial numbers of businesses: not just small traders, but successful larger businesses, can succeed without having any kind of support from the normal banking system. In the US, however, this is not normally the case: any kind of business other than a very small self-employed tradesman will already
have a bank account, except in fringe areas such as marijuana cultivation where legal changes may run ahead of financial risk.

How, then, do individual account holders get e-money into their accounts in the MoMo system? There are five main ways:

1. By being beneficiaries of disbursement organisations such as federal assistance programmes. In these cases, the disbursement organizations will move funds from their bank accounts into their MoMo e-money accounts in advance of the disbursement, and the money is transferred from those accounts to the beneficiaries’ accounts.
2. Through salary payments. If employees are paid through the MoMo system, their employers will move money from their bank accounts into their MoMo accounts, or will use money that is already in those accounts. The money is transferred from the employer’s MoMo account to the employees’ MoMo accounts.
3. By transfer from other account holders. Individual account holders in the MoMo system can send money to each other: for instance, where children working in cities may send funds to support their parents in rural areas. In these cases, the funds are already in the MoMo system and are simply transferred between the two accounts.
4. By remittance from abroad. In these cases, funds remitted from abroad are deposited directly in the MoMo accounts of the recipients.
5. By depositing cash. If account holders have cash – for instance, if their employer pays in cash – then they can deposit that cash at an agent and have the money credited to their e-money account. In these cases, the agent must have sufficient e-money in their account to cover the amount to be transferred to the account holder’s account.

It will readily be seen that the majority of these activities can take place in the absence of an extensive agent network. The only one of them which requires the presence of an agent is depositing cash. This activity, however, presents the agent with some difficulties. As has already been said, the agent must have sufficient e-money in their account to cover a cash deposit; and there are certainly implementations of e-money systems in the world where ensuring that agents maintain these floats has proven to be a significant issue in the administration of the system overall. However, these are typically e-money systems which are administered by Mobile Network Operators, and where the most common transaction by far is the purchase of airtime funded by cash deposits, particularly where airtime is sold at a lower rate to customers who use e-money. This means that agent float levels are critical to the liquidity of the system overall. In the MoMo system, however, this is not the case, and the liquidity of the system overall is negligibly dependent on agent float levels.

When we look at the expenditures of account holders, however, the picture is very different. The main expenditure activities of account holders are as follows:

1. Paying bills. The MoMo system allows account holders to pay domestic bills such as utility bills, rent, cell phone airtime purchase and others through their MoMo account. The creditor is either the bill creditor themselves or a payment aggregator, if payment aggregators are active in the local market.
2. Sending money to other account holders.
3. Withdrawing cash. An account holder can go to a MoMo agent and withdraw cash from their MoMo account. E-money corresponding to the amount withdrawn is transferred from the
account holder’s account to the agent’s account, where it can be used, for instance, to support customer deposits as described above.

4. Buying goods. An account holder can make purchases from a MoMo agent and pay for them using e-money from their MoMo account. As with a cash withdrawal, e-money corresponding to the amount withdrawn is transferred from the account holder’s account to the agent’s account, where it can be used, for instance, to support customer deposits as described above. Broadly speaking, it can therefore be seen that e-money arrives in the system from bank accounts outside it (those of disbursers and employers,) and thereafter moves from individual account holders (employees and the beneficiaries of disbursements and remittances) to agents via cash withdrawals and purchases of goods.

Where non-cash purchases are made from retail businesses in the USA, these typically attract a charge from the card issuer for processing the payment. While the MoMo system does charge agents for accepting payments for customer bills via the MoMo system, rates are much lower than the averages for credit and debit card purchases, because much less needs to be done. Also, agents receive the payment immediately and in cleared funds. There is no delay or doubt.

The economic benefits of a MoMo agency for businesses are therefore clear when compared with existing non-cash payment methods.

2.2 Agent registration

The MoMo system supports two kinds of agent registration. For independent businesses, an agent can register in the same way as an individual account holder can. The process for registering an agent is somewhat different from that for an individual in that an agent needs to provide additional information, but the channels available are the same as are described in the registration business process described in this response. Since the agent, like all MoMo account holders, is required to maintain a positive e-money balance in the system, no credit checks are required. It is even possible for an agent to exist entirely within the MoMo system, without any connection to an external account in the traditional banking system, though this is uncommon.

For agents which are subsidiaries of larger entities, such as the individual stores in a grocery chain, multiple agents can be registered by the head office. The MoMo system has an on-line tool which supports this. In these cases, the relationship between agents and their head offices is maintained, and the MoMo system supports the assignment of a proportion of the commission earned by a branch to their head office, either as part of the individual transaction or as a consequence of a roll-up process at the end of a defined period. The head office can also move money between its MoMo accounts and those of the individual agents.

Both head offices and individual agents have access to a website which enables them to produce reports, view transaction statements, and maintain the representation of their organization (for instance, by adding new assistants.) Standard role-based security (including maker/checker roles) ensures that staff are only allowed to see or change items of information that are within their competence.

No investment is required, either from head offices or from agents, to join the MoMo system. Provided a business meets the requirements, they can join and start transacting.
2.2.1 Requesting registration

MoMo provides the following routes for agents to become registered.

2.2.1.1 Direct application

Agents can register with the MoMo system by downloading the application and using it to register, or by going to a public website and registering via that. Both routes use the registration workflow described elsewhere in this response.

2.2.1.2 Account holder-led registration

If money is sent to someone for the first time, they will receive a message telling them that they can go to any business(es) local to them and ask them to register on the MoMo system. This means that the network can grow organically by ensuring that agents local to account holders are encouraged to sign up, no matter where those account holders might be.

2.2.1.3 Agents acquisition: Manufacturers

MoMo has a commercial team, who negotiate directly with the head office of large Consumer Goods Manufacturers, whom already has a very large National Distribution network with thousands of "sales points" (Agents). This is a tried and tested method for signing up large networks of agents.

2.2.1.4 Agent acquisition: Distributors

The MoMo commercial team will also negotiate with the distributors who supply large numbers of independent businesses over limited geographical regions. The distributors will offer MoMo agencies to their clients in the same way as the other products that they offer, and will be paid a commission in the same way as will head offices. Distributors will not, however, be able to view the statements or activities of the agents they supply.

2.3 Agents and assistants

The MoMo system does not require any items of specialized hardware, or any specific network connections, to be installed in agents’ premises. Each agent has one or more assistants assigned to it, and it is the assistant who transacts with the customer. When an assistant logs into the MoMo system as an agent (typically using their phone,) they see a menu which enables them to perform agent functionality such as accepting payments, registering customers, taking deposits and paying out withdrawals. In the agent mode, they are transacting on behalf of the agent, and all money movements use the agent account(s) and not the assistant’s account. Statements relating to the agent account always show the assistant involved in the transaction. This also allows AML checking to be performed on assistants as well as account holders: an assistant who is on an AML blacklist will not be permitted to register customers or participate in cash transactions, while the system will monitor and report on any transactions involving an assistant who is on an AML. It should also be noted that the MoMo system does not require agents or their assistants to perform KYC and AML verification: their function is merely to collect and verify the data so that the MoMo system can perform the verification.

The MoMo system is designed to be as easy to use for assistants as it is for customers; however, MoMo understands the importance of training for the smooth operation of the system overall. Assistants are trained to use the system in the following ways:

- MoMo provides training to the head offices of large organisations. Experts from the large organisations then train staff in the branches to use the system.
MoMo provides a web site which individual agents can use to train themselves.

Experienced assistants in a branch will typically train new assistants.

MoMo provides a 24/7 customer care centre. Assistants can telephone for advice on using the system and, if necessary and where permitted, staff in the call centre will undertake actions on behalf of the assistant.

In the future, the MoMo system will support NFC communications, which will allow their account holders to interact directly with NFC-enabled devices in agent businesses, where these exist.

2.4 Rolling out the system

Rolling out a system such as the MoMo one requires synchronization between the registration of customers and the registration of agents. If customers join the system but there are no agents in their area, then they will rapidly become disillusioned with the system. On the other hand, if agents join the system and there is a delay before customers start to use the system in their store, the agents’ capacity to serve the customer will be impaired. In MoMo’s plan for rolling out the system to agents in the US has the following form.

As has already been discussed, the financial model for agents is designed to make it simple and cheap for agents to register, and profitable for them to encourage customers to transact. There is therefore no need for a strong sell on taking up a MoMo agency: the key focus of the roll-out is to ensure that agencies are available where they are required, when they are required. Our plan for achieving this is as follows.

Prior to the launch of the MoMo system, the MoMo commercial team will work with distributors who supply small local businesses. We will sign agreements under which the distributors will offer MoMo agencies as a product to their client, together with training and set-up advice, in return for a commission on transactions performed at those agencies.

When the product is launched, we will work with the distributors to ensure that marketing campaigns target areas where the MoMo system is under-represented, or where we expect a large number of new account holders: for instance, where new disbursement payments are about to start.

The MoMo system also provides information about where account holders are registered, and where transactions are undertaken. The MoMo marketing team will analyse this information and ensure that agent coverage is sufficient in areas where there are more account holders than agencies.

In the US MoMo will build our agent network in a wholesale manner by leveraging the deep B2B distribution networks of durable and non-durable goods producers and both captive and independent distributors. This is not uncommon in the mobile money universe and has been a successful approach for MoMo in El Salvador. In the US, larger distributors can reach hundreds of thousands of retail establishments, across large geographical areas.

The Distributor will become a MoMo account holder, as will the retail businesses to which the distributor delivers goods.

The value proposition for the manufacturers and distributors is the elimination of the costly and ungainly financial management (and threat of fraud or theft) of cash transactions; the elimination of the processes associated with consolidating cash, check and wire transfer payments; and the lower cost
associated with MoMo payments compared with traditional payment system fees. MoMo can be used additionally on COD or “Just In Time” payments where credit is an issue. “Good Money” is available in the payees MoMo account virtually instantaneously. In this model, the distributors and producers become our Super Agents and their staff become the trainers of the retail outlet agents.

Super Agents earn a commission on their transfers, further reducing their cost.

The value proposition for the retail outlet is clear. The retail outlet, as agent, receives a commission on many types of transaction, and it is important to note that in addition to purchases, agents will see enhanced traffic from "Cash In" and "Cash Out" transaction. Where agents do not receive commission directly, MoMo’s charges will still be pitched to be demonstrably lower than the charges levied on retail businesses at present by traditional banks. Transaction fees to the merchant are therefore also decreased by the elimination of credit or debit card merchant fees.

The value proposition for the end user is the ability to maintain a financial account with no banking fees, no minimum balance, no possibility of overdraft fees or any of the other impediments to financial inclusion that the unbanked and underbanked currently face. MoMo account holders do not need a credit history. MoMo’s fees are scaled for transactions as low as under $5.

An internationally recognized pricing strategy of only paying for the services used allows greater access and fairer charging for individual users.

With MoMo’s convenience and cost value propositions, the system will also be attractive to the remainder of the population as evidenced by the vast variety of recent technology solutions that “Make Paying Easier” but involve funding from a trading bank or payments provider. MoMo use also creates a clean credit history.

Additionally, for individuals, the goal of the MoMo system is to use G2P and B2P payments to fund individuals’ MoMo Accounts. Bulk payers make one payment into their MoMo account which is distributed to the proper payees. The recipients pay no fee. Similarly, account holders will be able to pay bills too other MoMo account holders such as Insurance Companies, Utilities and other regularly scheduled payments using the pre-authorization and confirmation mechanism.

3  External services and the interoperability of the MoMo system

This section describes how the MoMo system interacts with third party service providers. It covers the mechanisms used to connect third party providers with the MoMo systems, the business processes used to structure and control these interactions, and the ways in which the MoMo system will support competition between providers. Although the MoMo application is a closed financial system, with all the advantages of speed and certainty that this gives to support financial inclusion, it also has a highly open and flexible interoperation model, which makes it quick and simple to set up interoperability with other service providers, both financial and more general. Some of these, such as utility companies, are a key part of MoMo’s financial inclusion strategy, and MoMo has therefore devoted considerable effort to ensuring that it is simple and quick to construct secure, high-function interoperability relations with those other service providers.
The mechanism for doing this is described in more detail below.

3.1 Connection mechanisms

The general architecture of the MoMo system manages interactions with external systems in the following way. External systems, including handsets and web sessions, interact with an external services API, which is responsible for articulating the core services to perform workflows – for instance, to verify that the parties to a transaction exist and are authorised to perform the transaction, to calculate the commission payable on a transaction, or to persist the transaction in a database. This API receives information in a standard form, no matter where it originates from.

Communication between external sources such as handsets, web browsers and third party businesses is managed by menus. The term menu is here used in its broadest sense, and reflects the origin of the process in a configurable way of managing the services a user has access to. The menu defines the appearance of the activity on a target device in general: for instance, what prompts are shown, the regular expressions which are used to check the validity of information entered by the user, and so on. In addition, it maps the content of those prompts onto the standard structures which are understood by the external services API.

The system supports multiple menu structures, reflecting the different types of interaction with the system and the different tasks that particular classes of user are allowed to perform. The content of menus can also vary with a user's status within the system: for instance, a user would only expect to see a set of menu items allowing them to interact with an insurance product if they had registered with that product. The particular menu required by a user is defined at login time; and, if a user's menu has changed since the last time they logged in, it is downloaded to their device again.

Menus are defined using a standard user interface which enables all of these structural items to be defined by a business analyst. No technical skill is required. Once a menu has been defined, it can be attached to a particular login and is then shown when a user logs in via any channel (handset, browser, API) that the overall implementation supports.

Communication between third party systems and the MoMo system is normally managed by RESTful APIs. In essence, a RESTful API is a website to which the third party system POSTs requests and from which it receives responses. The mechanism which allows MoMo to define menus for its handset and browser clients can therefore be used to define "menus" which define the API calls which are permitted.

The conversion between third parties and the MoMo system is therefore managed in the RESTful API itself. Information is transmitted from the third party system in forms which are convenient for that system. They are converted to the forms required by the MoMo external service in the RESTful API itself, using the mappings generated when the interface was defined. The values Posted to the MoMo API are in the form it requires. The reverse process happens when information is returned from the MoMo system to the RESTful interface: the definition of the API states how the information returned is represented on the "page" which constitutes the API for the third party.

The ease with which this system can be configured means that it is economical to set up and maintain interfaces with third parties individually. The complexities of negotiation which were required by more traditional forms of interface design have typically meant that it was economical to minimise the number of interfaces that needed to be developed and maintained. As a consequence, interfaces
tended to be generic structures (for instance, a generic interface for insurance products.) This approach brought its own problems, however. In particular, changes to interfaces could be cumbersome and difficult to make if there were a large number of separate third parties using the interface. This shift in the economics means that it is now feasible to create and maintain a separate interface for each third party. Changes can be made to the interface as required, and any changes will be automatically downloaded to the API when the business next logs on.

A diagrammatic version of this process is shown below:

3.2 Types of interaction with Third Party Providers

The content of transactions in the MoMo system can be set via configuration. This means that interactions with third parties which require party-specific types of information to be added to the normal transaction definition can easily be accommodated. Information types such as invoice numbers and special instructions are also simply added to the MoMo system, since all information types are configurable. The MoMo system also supports variants of existing transaction types, so that the basic mechanism of, for instance, a payment transaction can have additional specifications added for particular provided. These abilities provide a rich set of definitional features which enable existing transaction types to be extended to support interfaces with particular providers and, in combination with the facilities described in Section 3.1 above, allow these definitions to be added simply and quickly to interface APIs. [Sections U4.1, U4.2]

The MoMo system supports the following types of interaction with third party providers.

3.2.1 Internal MoMo Transactions

Third parties are able to generate transactions within the MoMo system. For instance, if the third party provides payday loans and a MoMo account holder’s application for a loan is successful, the third party can initiate a transaction via the API to transfer the amount requested from the provider’s MoMo account into the account holder’s MoMo account. This type of transaction takes place entirely within the MoMo system, and the third party is notified of its success via the API.
3.2.2 Transactions which rely on synchronisation with third party systems
If a MoMo account holder pays a utility bill, for instance, the financial transaction takes place within the MoMo system. Funds are moved from the account holder’s account to that of the utility. Nevertheless, the account holder needs to be confident that the payment has been recorded in the utility’s internal systems. The MoMo system will report the payment to the third party via the API, and await the third party’s confirmation that its internal systems have been updated to reflect the payment. Once confirmation is received, the customer is notified by the MoMo system. Transactions can be configured so that the transfer of funds is only complete when confirmation is received from the third party, or to complete within the MoMo system and leave confirmation as a subsequent step. In the former case, funds will be reserved in the account holder’s account in the MoMo system to prevent them being used twice by the account holder.

3.2.3 Transactions where the MoMo customer has pre-authorised payment
If, for instance, a MoMo customer is buying from an online merchant, the MoMo customer will generate a voucher in the MoMo system to pay for the goods ordered. They will then enter that voucher number on the third party’s site. The third party can then contact the MoMo system via the API to request payment against the voucher. The transaction is completed in the MoMo system, and funds are transferred from the account holder’s MoMo account to the third party’s MoMo account. The API then reports back to the third party that the transaction was successful, and the third party can update its records accordingly.

3.2.4 Multi-part transactions
The MoMo system also supports multi-part transactions. In these transactions, a single transaction in the MoMo system includes phases which are performed in the third party system. Among other things, this mechanism supports multi-party authorisations for transactions, allowing service providers to authorise or confirm, for instance, payments to a MoMo account holder’s account with the service provider. These transactions are of two types.

3.2.4.1 Transactions initiated in the MoMo system
If a MoMo account holder has a savings account with a third party provider, they may wish to deposit funds into that account. They can initiate a MoMo transaction from their handset (or other device) to do that. In a transaction of this kind, funds will first be reserved in the account holder’s MoMo account so that they cannot be re-used. Then the MoMo system will contact the third party system via the API. The third party will respond to say that its internal systems have been updated to record the deposit. At this point, the reserved funds will be debited from the account holder’s MoMo account and credited to the third party’s MoMo account. Both parties will then be notified of the transaction: the account holder through their preferred channel and the third party via the API.

3.2.4.2 Transactions initiated by the third party
If a MoMo account holder has taken out a loan with a third party provider, they will have agreed to a payment schedule. It is an inviolable principle of the MoMo system, and a key pillar of financial inclusion, that funds can only be removed from a MoMo account holder’s account with their consent at the time. In order to obtain a scheduled payment, the third party will initiate a payment transaction via the API. This will generate a request for confirmation to the account holder. When the account holder assents, funds will be reserved in their MoMo account and the MoMo system will report this to the third party via the API. The third party will update their internal systems to reflect the credit and will report...
back to the MoMo system. The MoMo system will then complete the transaction and move the funds from the account holder’s MoMo account to the third party’s MoMo account.

### 3.3 Managing the relationship with Third Party Providers

MoMo is concerned to attract a wide variety of third party suppliers to its system, since part of the meaning of financial inclusion is to give account holders to MoMo system access to a full range of financial and non-financial services. MoMo therefore intends to form relationships with as many providers as possible, and has a commercial team dedicated to creating and maintaining these relationships.

A key to the relationship between MoMo and third party service providers is that transactions in the MoMo system are always between MoMo accounts. This means that any organisation which wants to provide services through the MoMo system must open and maintain one or more accounts within the MoMo system. The fact that this is the case means that MoMo need make far fewer checks than normal on the financial health of prospective suppliers. Money which is transferred between MoMo account holders and service providers remains in the MoMo system until the third party specifically transfers it from the MoMo account into an account in an external system. By varying the conditions under which this money can be withdrawn by the third party using configurable rules, MoMo is able to ensure that third parties always have sufficient account balances in the MoMo system to cover the resolution of problems that may arise.

There is one exception to this structure: where the service provider is providing a promise of future payment. An example is the provision of life insurance services, where the MoMo account holder is buying a promise of payment in the future. In these cases, MoMo will deal only with service providers who are already regulated and approved by independent regulatory authorities, and will ensure that its account holders are explicitly included in the class of clients whose interests are protected by those regulators.

### 3.4 Costs levied by third party service providers

Third parties will, of course, be able to levy costs against MoMo account holders for use of their services, although they may decide not to do so. The MoMo charging model is flexible enough to allow service providers to make this choice themselves. This process will work in the following way.

#### 3.4.1 Advertisement of costs

Service providers are allowed to produce definitions of their services. These are reviewed by MoMo to ensure that they comply with consumer legislation appropriate to the service and the market where it is being offered. Once approved by MoMo, they can be added to the MoMo consumer menu system, so that consumers can request information about a service they may be interested in buying. These advertisements are not downloaded unless specifically requested by the consumer.

One of MoMo’s requirements for these advertisements is that they should contain clear statements of the costs associated with the provision of these services, so that potential users of the service can readily understand them.

#### 3.4.2 Quotations

As well as the advertisement of costs, the MoMo system allows service providers to provide a quotation service. This is a specialised form of transaction, which allows an account holder who is a potential user...
of the system to request a quotation for a specific requirement. For instance, providers of payday loans may define a quotation transaction which allows an account holder to specify the amount that they want to borrow and the term over which it will be paid back. This information will be sent to the service provider via the API, and the service provider can return a response which can be returned to the account holder. The information returned can optionally include an acceptance trigger, which will initiate a further transaction to accept the offer and (in this case) transfer the loan funds to the account holder. These quotations are set up and configured as part of the API definition with the supplier.

3.4.3 Market places
As well as individual quotations, the MoMo system will support a market place system. This will allow a MoMo account holder to compare and contrast offerings in a particular area from different service providers. This feature will allow side-by-side comparison of the advertisements (see Section 3.4.1 above) and quotation facilities (see Section 3.4.2 above) of participating providers in the same area. Third party service providers will be able to decide whether or not to participate in a market place; if they do, MoMo will work with all providers in the service area to ensure that their representations are comparable with each other and that MoMo account holders are able to make an informed choice between the offerings of different providers.

3.4.4 Per-transaction costs
As described in the original proposal, the MoMo system always shows account holders the costs associated with a given transaction before that transaction is executed, and gives them the opportunity to confirm or cancel the transaction at that point. This will also be the case with transactions where the other party is a third party service provider. The MoMo consumer will always be clearly shown what charges they are paying on a given transaction, and will be given the opportunity to confirm or cancel the transaction at that point.

Where cancelling a transaction may have adverse financial consequences for the account holder (for instance, where declining a loan payment may incur additional interest payments) the account holder will be informed of this and given a further opportunity to confirm the payment.

4 The registration process
A number of specific questions in the Preliminary Assessment refer to the registration and authentication processes for customers. These are dealt with in the presentation entitled “MoMo Registration Process” which is shown in a separate document which forms part of this response.

Provided that US regulators will permit this method of registering, the MoMo system will support paperless registration, as is described in the following presentation. This method of registration is already supported in some countries in Latin America and the Caribbean. The presentation also describes means of verifying the information entered by a user.

5 Answers to specific questions from the Preliminary Assessment
This section contains answers to questions in the Preliminary Assessment which do not form part of the larger-scale answers given above.
5.1 Stress testing on the solution’s ability to scale

A cloud based solution is used to provide the performance and scalability testing for the platform.

A coded solution utilising the Microsoft Visual Studio Team Services capability has been implemented. This is deployed onto a representational cloud hosting, which allows the solution’s infrastructure, architectural and code solutions to be performance tested prior to release.

The application has a full repertory of use case-based tests already developed. These are used in automated build testing already to ensure the integrity and functional correctness of the application. These tests can then be scaled to any level of representative virtual users. This approach allows for any combination of transactions or anticipated usage scenarios, including surges, to be trialled. Realistic data creation for Customers and Agents is used to ensure accurate data profiles.

Detailed Reporting and Diagnostics across the platform allow infrastructure and software metrics to be collated. The use of additional monitoring tools adds additional software diagnostics to a granular level.

The testing solution is automated with minimal setup and tear down times so is able to be run as part of the Agile SDLC for platform components.

The timescales for standard performance testing evolution are as follows:

- Full Use Cases automation coverage as part of continuous integration based fully from market menus [2016.Q4]
- Full automation of Azure environment provisioning to support infrastructure and platform deployment. [2017.Q1]
- Performance testing as a standard CI processes for all new functionality at 100% coverage [2017.Q2]

Planned specific performance work streams in addition to the standard continuous automation and integration processes:

- Surge Scenarios (25% – 200%) [2017.Q2]
- Feature Uptake Scenarios [2017.Q2]

5.2 Stress testing on service continuity

The performance and scaling test suite described in Section 5.1 above enables us to run regular tests which simulate the application running under load at a level specified by the test team. One of the problems with testing for service continuity where infrastructure is purchased as a service, however, is that continuity testing is more difficult than it is where the infrastructure is physically present on the client’s site and disasters like power outages and server and network failures can be simulated directly.

The MoMo solution is to make use of the testing tools developed by Microsoft for use by their clients. These tools support the simulation of an extended number of faults relating to business continuity, including:

- Restart a node
- Restart a deployed code package
- Remove a replica
- Restart a replica
- Move a primary replica
- Move a secondary replica
- Restart a deployed code package where a partition is hosted
- Remove a primary/secondary replica or stateless instance
- Restart a primary secondary replica (if a persisted service)
- Move a primary replica
- Move a secondary replica
- Restart a partition

The tools are configured to test all the partitions on which the service runs, and to run for two hours with a maximum stabilisation time (the time between the fault being generated and the service being fully restored) of one minute. They are run weekly to check that the configuration of the service has not been compromised, and also as part of the standard deployment process for releases.

It should also be added that the fact that the application is designed so that releases can be added in any area without downtime, as described in the proposal, is in itself a good test of business continuity, since the deployment process involves sequential restarting of nodes across the system.

5.3 Dispute resolution

A recent CGAP report identified poor customer recourse as one of the key areas of consumer risk for Digital Financial Services (https://www.cgap.org/sites/default/files/Focus-Note-Doing-Digital-Finance-Right-Jun-2015.pdf). MoMo is committed to ensuring that its dispute resolution procedures, both for individuals and businesses, are of the highest quality, in terms both of the processes themselves and of ensuring that our account holders know when and how to access them. Our commitment to financial inclusion means that we are mindful of the fact that our customers may well have had bad experiences with the financial system in the past, and that part of our function is not just to provide them with a way to join the financial system, but also to reassure them that they can get a fair hearing if they have a problem.

Key features of this policy are as follows:

- MoMo account holders must be clear that they are not wholly reliant on MoMo to resolve problems that arise, but can go to an independent body at any time during the dispute resolution process.
- Where disputes arise between individual account holders and businesses, MoMo will make every effort to ensure that the individual account holder does not feel that businesses are unfairly advantaged by the dispute resolution process.
- MoMo invites regular external reviews of its processes, to make sure that it is always at the forefront of dispute resolution procedures. In the US, these will be carried out by the Consumer Finance Protection bureau.
- MoMo recognises that, in many cases, apparent disputes are actually requests for help or further information. Dispute resolution staff are regularly briefed on how to identify requests of this kind and give them early support to resolve problems before they turn into fully-fledged disputes. Extensive on-device and web-based help systems also help account holders to use the system properly and effectively.
The general principles of MoMo’s conflict resolution procedures are shown below.

- Terms and conditions for the MoMo system will be available to all account holders as a page on the account holder’s mobile phone or web page.
- Any changes to the terms and conditions will be notified to account holders using the MoMo system’s News feature.
- Account holders will be required to state that they have read, and assent to, the current terms and conditions as part of the registration process.
- If any MoMo account holder has a complaint, then they can contact the MoMo support center by SMS, phone or email.
- The MoMo support center is open 24/7. Any closure of the center will be announced in advance via MoMo’s News feature.
- The MoMo support center’s telephone numbers and email address are published on the MoMo website and are downloaded to all account holders’ handsets via the Contact Us page on user and agent menus. MoMo will also publicize both its own call center and the independent arbitration service by marketing, both directly to account holders and by general advertising.
- The call center will respond to a customer request within 15 minutes. Each response will include a reference number which the account holder can use to identify the call.
- The customer reference number will be quoted on all internal documentation produced by the MoMo call center relating to the call.
- All actions taken by the MoMo call center in relation to a complaint will be documented, and will be available to any party to the complaint on request. Documentation will normally be provided via email, but customers without email can elect to have the documentation send to their phone as a news item.
- All complaints will be resolved within three days.
- As a consequence of a complaint, the MoMo call center may:
  - Suspend or revoke the registration of one or more parties to the complaint, absolutely or until specified conditions are met
  - Refer the complaint to the relevant law enforcement or financial regulation agencies
  - Reimburse one or more parties to the transaction
- If a complainant is dissatisfied with the resolution of their complaint, then they will be directed to an independent arbitration service. In the USA, this will be the Consumer Finance Protection Bureau, a government agency dedicated to ensuring that consumers are treated fairly by financial institutions.
- MoMo will engage in the CFPB examination process as part of the preparations for system roll-out, and will continue to work closely with the CFPB to ensure that their customers are treated fairly and their complaints resolved swiftly and effectively.

Obviously, the specific requirements of a complaints resolution procedure will be different in different legal jurisdictions. MoMo has a detailed conflict resolution manual for its operations in El Salvador. This is reviewed regularly by government regulators, and MoMo employs a Chief Compliance Officer who has overall executive responsibility for, among other things, ensuring that the dispute resolution process is as effective as possible. We will implement a process which meets the same principles in the USA.
5.3.1 Dispute Resolution Process Diagram

The following shows a diagrammatic representation of the current dispute resolution process in El Salvador:

![Dispute Resolution Process Diagram]

5.3.2 Service Level Agreements

MoMo account holders are able to contact MoMo at any time, since there is a 24/7 service available for customer care service. The subscriber is able to report an issue or ask for an update on the incident resolution progress.

In order to report an incident, an account holder must provide information regarding the incident to validate the claim. This information should include the ID number which was used in the registration process (e.g. SSN), the date of the incident, the parties involved and description of the incident that is being reported.

The incident will be given an initial priority number. This initial assessment may be changed in the course of subsequent investigation, but will be one of the following categories:

1) Priority 1: financial and/or security impact, caused by fraud
2) Priority 2: financial and/or security impact, not caused by user error
3) Priority 3: financial impact caused by user error
4) Priority 4: no financial or security impact

Once an incident has been reported, the complainant will be contacted within 10 minutes if the complaint has not yet been resolved, and is given a reference number which can be used to track the progress of the complaint. Incidents which can be resolved within this time are not given an incident reference number, since they are typically requests for information. However, they are recorded in the MoMo system for reporting and analysis purposes.
To make a claim regarding a transaction, the problem should be reported within 5 days. If the transaction involves a third party as wrong recipient, the claim should be made in the next hour after the transaction is completed; but reversion is not guaranteed, because the third party must authorize the movement.

If an incident cannot be resolved in the target timeframe, it will be escalated to individuals beyond the on-call support as described in the table below. The key stakeholders who are involved in the resolution process are:

1. Tier 1 Support: Customer Staff, call center and agent management Teams
2. Tier 2 Support: Customer Helpdesk and Super-User Teams
3. Tier 3 Support: Customer Operational Support Team
4. Tier 4 Support: Operational and Architecture Support Team
5. Project Management and Operations Management Team
6. Project Sponsors
7. Executive Level Stakeholders

<table>
<thead>
<tr>
<th>Elapsed Time</th>
<th>Priority 1</th>
<th>Priority 2</th>
<th>Priority 3</th>
<th>Priority 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 minutes</td>
<td>Escalate to Tier 2 Support</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 minutes</td>
<td>Escalate to Tier 3 Support</td>
<td>Escalate to Tier 3 Support</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 hours</td>
<td>Escalate to Tier 4 Support</td>
<td>Escalate to Project and Operations Management teams</td>
<td>Escalate to Tier 4 Support</td>
<td></td>
</tr>
<tr>
<td>4 hours</td>
<td>Escalate to Project Sponsors</td>
<td>Escalate to Project and Operations Management teams</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 hours</td>
<td>Escalate to Executive Stakeholders</td>
<td>Escalate to Project Sponsors</td>
<td>Escalate to Tier 4 Support</td>
<td></td>
</tr>
<tr>
<td>24 hours</td>
<td>Escalate to Executive Stakeholders</td>
<td>Escalate to Project and Operations Management teams</td>
<td>Escalate to Tier 4 Support</td>
<td></td>
</tr>
<tr>
<td>5 days</td>
<td></td>
<td></td>
<td>Escalate to Project and Operations Management teams</td>
<td></td>
</tr>
</tbody>
</table>

5.4 Settlement and compliance for cross-border payments

With Cross border transfers, there will be countries where MoMo does not have a physical presence and in that situation MoMo will rely on commercial banks, and their Correspondent Banking relationships, to support the banking needs of MoMo and to facilitate local settlement and, with local mobile money.
providers, act as distribution outlets. Both the banks and the Mobile Money service providers will be vetted to ensure that they are complaint from a regulatory standpoint.

The basic principles of our Foreign Exchange offering will be as follows:

- **Our objective is to enable a MoMo account holder in a given country to send money to a person in any other country where it is legal to send it. Our preferences are as follows:**
  - If the destination country has a MoMo implementation, we will send it to that system. If the recipient does not have an account in the MoMo system, the payment will be sent to them as an unregistered user, and they can register with the MoMo system to cash the payment.
  - If we are partnering in the source country with a financial institution which offers remittance services to the required country, we will use the financial institution.
  - Otherwise, we will use the remittance services of a third party. Any charges levied by the third party will be passed on to the customer.
- **MoMo does not plan to take foreign exchange positions itself, and will not expose itself to potential risk relating to FX completions.**
- **MoMo will obtain the best FX deal possible for its account holders, consistent with the two objectives given above. It will actively encourage FX providers to join the MoMo ecosystem and compete with each other for account holder business.**

The basic principle of FX and remittance operations in the MoMo system, as with other third party interfaces, is as follows:

1) Transactions will take place within the MoMo system, in order to preserve the balances of double-entry book-keeping within the MoMo system. MoMo supports multiple currencies, and the organizations with whom we partner will be expected to maintain accounts within the MoMo system.

2) This will ensure that MoMo account holders’ interests are protected, and that MoMo is able to resolve any disputes that might arise.

3) MoMo’s multi-part transactions will allow partners to confirm that transactions in the MoMo system have been reflected in their internal systems before the transactions are completed in the MoMo system.

4) If partner systems are not capable of responding in a reasonable time, then the MoMo transaction will complete and a secondary transaction will be generated to request completion of the transaction in the partner’s system and to relay confirmation to the MoMo account holder once the response is received.

5) This will ensure that MoMo account holders can be confident that their money is safe during the exchange and remittance processes, and will allow MoMo customer care full control over any disputes that might arise.

### 5.5 Partnering with FX Providers

The current implementation of MoMo in El Salvador is a single-country system which does not support international transfers. We will support international transfers using the preference system defined in Section 5.5 above.

MoMo does not intend to take FX positions itself. Initially, we will rely upon our commercial bank partners for FX trading and settlement services. As economies of scale grow, we will explore other
solutions in order to control costs, manage bid/offer spreads and better manage internal FX flows between MoMo subsidiaries.

Since this is the case, no detailed information is available at present on the SLAs that will be in place between MoMo and the suppliers of FX and remittance services with whom we will eventually partner. However, the following constraints will be required to form part of any agreement that MoMo makes with a remittance of foreign exchange partner:

1) The partner will be required to register with the MoMo system and to maintain accounts in the MoMo system. These accounts will be subject to MoMo’s normal rules for business account holders.

2) Transactions will take place between MoMo accounts, and will be subject to the same constraints on completion and the transfer of good funds as are other MoMo transactions.

3) Partners are required to state the terms under which they will guarantee to honor transactions initiated by MoMo account holders. These terms will be converted into rules in the MoMo system and will undertake a testing schedule agreed with both parties. Once both parties agree that the rules are valid, the partner will agree not to reject transactions initiated by MoMo account holders according to the agreed rules. Any such transactions will be immediately completed by the MoMo application, and any which are subsequently rejected by the partner can only be reversed through the dispute resolution process.

4) Partners will be required to state clearly the charges that they intend to levy on any transaction, and to permit MoMo to inform its account holders of the charges being levied before the account holder confirms a transaction.

5) This information should be held within the MoMo system, and should not require a request from MoMo to obtain it for a specific transaction.

6) The partner will be required to enter into a commitment for the time taken to respond to a request from the MoMo system. This commitment will be permitted to have an averaging component, such as “99% of transaction requests in any given day should complete within 5 seconds.” These commitments will cover at least the following categories:
   a) Time taken to confirm receipt of a request from MoMo
   b) Time taken for the MoMo system to receive a definite response from the partner, confirming either that the transaction has been completed and the partner’s systems updated to reflect this fact, or that the transaction has been rejected.

7) If the transaction is rejected, the partner must provide a reason for rejection. This reason must be selected from a catalogue of rejection reasons agreed between MoMo and the partner.

8) IT will be at MoMo’s discretion to decide how transactions with a given partner will be structured. For instance, based on the agreed response times, MoMo may decide to wait for completion of the transaction until a response from the partner is received, if the partner’s committed response time is short enough. Alternatively, it may decide to complete the transaction and transfer the funds before a definitive response is received from the partner’s system. In this case, the MoMo application will send a message to the account holder confirming completion of the transaction in the partner’s system when such confirmation is received.
5.6 The value proposition for agents

The distributors and manufacturers become our Super Agents and their staff become the trainers of the retail outlet agents.

The value proposition for manufacturers and distributors is:

- The elimination of the costly and ungainly financial management (and the threat of fraud or theft) associated with cash transactions.
- The elimination of the processes associated with consolidating cash, check and wire transfer payments.
- The lower cost associated with MoMo payments compared with traditional payment system fees.
- MoMo can be used additionally on COD or “Just In Time” payments where credit is an issue.
- “Good Money” is available in the payee’s MoMo account virtually instantaneously.
- Super Agents earn a commission on their transfers, further reducing their cost.

The value proposition for the retail outlet is clear:

- The retail outlet, as agent, receives a commission on many types of transaction.
- It is important to note that in addition to purchases, agents will see increased footfall from "Cash In" and "Cash Out" transactions.
- Transaction fees to the retail outlet are also decreased by the elimination of credit or debit card merchant fees.

5.7 Value proposition for banked customers

The existing retail banking model in the US relies on the provision of free banking services to those who have least need of them, and on the provision of credit services to retail banking customers. The MoMo offering is aimed at those who are not served at all by the retail banking market; but there is a significant proportion of the US population which is only partially served by the existing banking service. MoMo will offer them a service which will enable them to undertake reliable transactions at low cost outside the traditional banking system. We will actively market our service to people in this position, and, since they are the people most likely to be paying bank charges, we expect traditional banking revenue from bank charges to decline as people switch to the MoMo system. This will place further constraints on traditional banks’ revenue from individual account holders, and any response from the banks which puts further burdens on individual account holders will represent a further opportunity for MoMo.

5.8 The business case for businesses to use MoMo

The focus of the MoMo solution is the unbanked, and the business relationships on which we rely to ensure that we can furnish our target market with the services it requires. In this endeavour, the following types of business are critical:

a) Small retail outlets (our agent network) which interface directly with our account holders. These may be fully independent businesses, or wholly owned subsidiaries of larger organisations such as pharmacies.

b) The organisations that supply those small retail outlets. These may be manufacturers but are more likely to be distributors. We want these organisations for the following purposes.
(1) To recruit agents from among the businesses they supply
(2) To work with us to ensure that our agents are properly trained and supported.
(3) To provide a degree of financial management to the agents, and, in particular to ensure that the agents can maintain the required levels of liquidity.

c) The people who employ our clients and pay their salaries. Payment of salaries through the MoMo system, particularly by small businesses, is one of the key ways in which e-money enters the system.

We intend to reach these classes of businesses in the following ways.

a) Small independent retail outlets will be targeted by the distributors that supply them and by individual account holders asking them to provide MoMo services. MoMo does not intervene directly in this process, relying instead on the account holders and distributors to provide the pressure.

b) Large distributors, manufacturers and retail chains will be targeted directly by MoMo’s commercial and marketing teams. Our objective is for as many of these organisations as possible to be offering MoMo services to the businesses they supply.

c) Employers will be targeted by more general marketing campaigns raising awareness of the benefits of paying salaries through the MoMo system. In the case of some large employers of low-paid employees, the MoMo marketing and commercial teams will contact them directly.

There will inevitably be commercial relationships between the businesses described here. This is particularly obvious in the case of distributors and manufacturers, where the small retail outlets who are their clients will be making regular payments to those suppliers.

MoMo will support organic growth of banked businesses who wish to join the system, but will not be specifically targeting the expansion of the system into the business space except in the areas defined above.

It is also worth mentioning that the MoMo system has a value proposition for businesses at the lower end of the scale in terms of size and stability. The MoMo system is particularly well adapted to allowing small businesses, which may not have very good credit ratings, to maintain a good relationship with their suppliers, particularly where many deliveries may be paid for COD or LOL. Essentially, the business case here is the same as for individual account holders: the highly structured nature of the MoMo business model allows small businesses to manage their money effectively and to build up a good credit record simply. The same will be true for small employers who pay salaries through the system, but who will have an interest in building up e-money through sales to other entities in the MoMo system.

5.9 Roles relating to dispute resolution

The following roles are defined in the error resolution process currently in place in El Salvador. We expect this process to form the base of our complaints resolution process in the US, but changes may be made as part of the deployment process in the US.

1. Receptionist. The receptionist is responsible for putting the user at ease and making a report with information provided for the user. In this first step the user is identified and the current status of the transaction is established.

2. Detective. The detective is responsible for identifying both immediate and underlying problems. The investigation takes place based on the information provided by the customer, and tries to
get details that contribute to the resolution process (third party contact information, available funds from creditor, previous complaints with the same situation, etc.)

3. Filter. The role of the filter is to determine whether the user really has a complaint that needs elevation to a more formal resolution process, or simply needs information or an explanation.

4. Educator. The educator makes use of an immediate opportunity to improve financial capability through immediate provision of information and explanation of matters that may be a matter of misinformation or misunderstanding. The educator provides the customer with information to clarify situation when the problem is about misinformation rather than error.

5. Conflict resolution office. If a complaint involves a third party and the resolution requires a reversal process, the conflict resolution office contacts the third party to inform them of the situation and ask for authorization to reverse the transaction.

5.10 Cancelling Payments

The following processes are implemented to allow payments to be cancelled. As a general principle, it should be emphasized that transaction completion is final, and that if money is sent or payments are made in error, the recipient is the rightful owner of the funds. This fact is set out clearly in the application’s Terms and Conditions. In the real world, account holders will normally send small amounts first to check that the funds are being by the correct recipient, before sending significant funds.

This state of affairs is a necessary consequence of the application’s commitment to assuring its account holders that money transfers are clear, immediate and irrevocable, which is a fundamental pillar of systems which are designed to promote financial inclusion.

Our original proposal set out in detail MoMo’s acceptance of, and adherence to, the principles set out in the Gates Foundation’s LevelOne project (see Section 11, p. 144 of the original MoMo proposal, and https://leveloneproject.org/wp-content/uploads/2015/04/The-Level-One-Project-Guide-Designing-a-New-System-for-Financial-Inclusion1.pdf.) Of the principles set out in this standard, the following mean that the standard chargeback model used by credit and debit card operators is not appropriate for the financial inclusion model:

- The LevelOne project specifies that payments should be push payments rather than pull payments, and this is a characteristic of the MoMo system. The chargeback model relies on being able to pull payments from accounts if this is deemed justified by the operating organization.
- The LevelOne project specifies that settlement should be as close to immediate as possible. This is a characteristic of the MoMo system, which settles payments immediately. In the chargeback model, however, money transferred is not actually confirmed until after the expiry of the period during which a payment could be reversed.
- The LevelOne project specifies that transactions should be irrevocable. It is worth quoting the statement of this principle given by the Gates Foundation “The system should not specially manage transaction reversal by the originating party nor specify situations in which the liability for a transaction is passed from one participant to another. This eliminates the complexity and services infrastructure required by the system to reverse transactions, thereby eliminating
significant system cost.” This is the approach taken by the MoMo system, whereas the chargeback system means that transactions cannot be regarded as irrevocable.

5.10.1 Self-conciliation
It is possible for account holders to resolve the problem of a mistaken payment themselves. The creditor receives the funds immediately and is the rightful owner. Therefore, if the debit party can reach the creditor directly, the creditor can cancel the payment by requesting a reversal to return the funds to the debit party or simply transfer it back to the debit party as a new transaction. The latter course will, however, incur a transfer charge.

5.10.2 Request reversal
If the debit party wants to request a reversal, they need to raise a request with Customer Care. Customer Care will then initiate a business process whereby MoMo will attempt to reach agreement with the creditor. The payment can be cancelled only if both debit and credit parties agree to do so.

This includes situations where a payment to a business has been misdirected: for instance, where an account holder pays a utility bill, but mistakenly enters their utility account number wrongly. In the comprehensive model for transactions of this type, the transaction will not be complete and the payment will not be made until the utility has confirmed that the transaction has completed correctly. In the partial model for transactions of this type, however, the payment is made in the MoMo system and notification is sent to the utility. If the utility then reports a mismatch between the user and their account number, the utility can request a reversal and a message will be sent to the account holder informing them that the payment has failed.

5.10.3 Cancelling a Pre- Authorized Payment
A pre-authorized payment process involves the following steps:

- The transaction initiator (the creditor) will execute the transaction indicating affected accounts and amount. When the request process is finished, the transaction will require a confirmation to be completed.
- The responder (the debtor) will be notified that pending tasks are waiting for them, depending on the notification channel they have selected.
- When the debtor accesses the application or internet portal, they will be shown the payments pending and ask to confirm that they are allowed to proceed. They can cancel the transaction at this point.
- Should they choose cancel the transaction; the creditor is notified that the transaction was cancelled by the debtor.
- If cancelling the transaction will result in additional costs to the debtor (for instance, if cancelling a loan repayment will result in additional interest being charged by the creditor,) the debtor will be informed of this and given another chance to confirm the transaction.

Once the debtor has gone through this process, they can still ask for the payment to be reversed, using the procedures described in Section 5.10.2 above.

5.11 Maximum Account Balances
The solution is configurable to allow maximum account balances to be set up, and these can be varied according to account type and role type – so, for instance, the maximum account balance can be set at a
different level for businesses and individuals, and can also be varied for individuals according to the KYC level they have reached. Since the system also allows new role types to be set up and applied to groups of account holders, the system offers great flexibility.

It is also possible to vary the rules according to the type of transaction. This allows, for instance, salary payments to be processed whether or not the payment results in the account holder’s balance exceeding its normal limit.

The rules applicable to a participant in a transaction are evaluated at run time, when the transaction is created. Changes to the rules are therefore applied immediately. An individual entity may also have more than one account balance limit associated with different roles. If this is the case, the lowest balance is applied.

5.12 PII Data Encryption

Data being transported through the system is protected by TLS (Transport Layer Security) encryption. This is a standard method of protecting data in transit which is widely used across the industry, and is commonly referred to as SSL, which is in fact its predecessor.

Data at rest (i.e. data persisted in the MoMo database) is protected by Microsoft’s Transparent Data Encryption (TDE) algorithm. This is defined by Microsoft in the following way:

*Transparent Data Encryption (TDE) encrypts SQL Server, Azure SQL Database, and Azure SQL Data Warehouse Public Preview data files, known as encrypting data at rest. You can take several precautions to help secure the database such as designing a secure system, encrypting confidential assets, and building a firewall around the database servers. However, in a scenario where the physical media (such as drives or backup tapes) are stolen, a malicious party can just restore or attach the database and browse the data. One solution is to encrypt the sensitive data in the database and protect the keys that are used to encrypt the data with a certificate. This prevents anyone without the keys from using the data, but this kind of protection must be planned in advance.*

*TDE performs real-time I/O encryption and decryption of the data and log files. The encryption uses a database encryption key (DEK), which is stored in the database boot record for availability during recovery. The DEK is a symmetric key secured by using a certificate stored in the master database of the server or an asymmetric key protected by an EKM module. TDE protects data "at rest", meaning the data and log files. It provides the ability to comply with many laws, regulations, and guidelines established in various industries. This enables software developers to encrypt data by using AES and 3DES encryption algorithms without changing existing applications.*

5.13 How was the 25% redundancy figure selected?

The 25% online redundancy figure was specified based on the platform’s ability for rapid scaling and knowledge of its steady state and fluctuation characteristics. Regular statistical analysis of transaction volumes, both overall and broken down by transaction type and category, is performed and is used as the input to capacity planning meetings. This allows the immediate capacity for unplanned day to day fluctuations to be adequately managed. Our experience is that 25% capacity overhead, measured against average transactional maximums over the busiest minute of a day, is sufficient. It should be remembered, first, that the online redundancy figure is only required to support performance from the point at which real-time system alerts are triggered to the point at which additional capacity can be
added to the system, which is typically measured in minutes in a virtual cloud-based solution; and, second, that capacity issues in the system are first of all experienced as slow running rather than system outage. This provides a further buffer state until additional capacity can be added.

Planned platform usage changes or events that have an impact on the platform and capacity are supported by scaling the platform prior to the event based on comprehensive Use Case based performance testing and resulting metrics. This includes events which are marketing-related, such as special offers, as well as consumption-based events such as large-scale benefit payments.

The system is monitored both for throughput and for performance. Automatic triggers are in place to alert operations staff to any potential bottlenecks due to unexpected increases in performance.

Regular capacity planning meetings, supplemented by emergency meetings where necessary, are attended by all technical stakeholders. Performance and capacity are reviewed and decisions to increase capacity are taken where required. The frequency of these meetings is also variable, depending on the lability of the system.

This is a process which is familiar to the technical team who support the solution, and which has been used successfully to support the largest mobile money applications in the world. We intend to apply it in the MoMo installation.

5.14 Payment System Rules

The rules governing payments in the MoMo system are developed initially by the MoMo organization. They are based on the laws relating to financial systems in the country where the system is deployed, and on the principles developed and enunciated by NGOs which specialize in the development and maintenance of systems which support and increase financial inclusion: in particular, the Consultative Group to Assist the Poor (CGAP: http://www.cgap.org) and the Gates Foundation (http://www.gatesfoundation.org/What-We-Do/Global-Development/Financial-Services-for-the-Poor).

A fundamental pre-requisite for the adoption of these rules is that they should be fully supported by government. Once the rules are developed, they are reviewed by the relevant government and central bank regulators and, once approved, are adopted by MoMo.

The MoMo system is based around a flexible payment model which is designed to support all types of payment model by configuration. The structure of a financial transaction is broken down into one or more workflows, and these workflows allow MoMo’s staff fully to specify the structure of a financial transaction. For instance, it is possible to specify points at which, for instance, funds are reserved in or transferred from a debtor’s account, or the points at which information is sent to one or more of the parties to a transaction and the types of confirmation that those parties are expected to give. Workflows also allow conditional processing to take place, depending on the parties’ financial status at the time the transaction is initiated or on their responses to confirmation requests. The workflow model is also extensible, and allows new actions to be developed where required.

Once the transactions have been defined to support the payment rules, a detailed test plan is evolved to ensure that all transaction types are consistent with the payment rules. After the test plan has been verified, it is automatically executed and checked as part of the nightly build process. This ensures that the application continues to conform to the agreed payment rules as features are added or changed.
Where the payment system rules specify actions to be taken in case of disputes, errors or fraud, these rules will be added to the dispute resolution process and taken through the review and approval process for dispute resolution. This process is described in Section 5.2 above.

Where payment system rules need to be changed, the changes go through the process described above.

MoMo will apply this process, which has been proved to work in its implementation in El Salvador and is currently in process in Colombia, in its proposed implementation in the US.

5.15 Data Breaches
MoMo will establish a data breach plan prior to operations in the US including the establishment of a response team. The typical initial steps of this are rectifying the breach, removing the hacker, restoring the affected systems, restoring security to the affected accounts, preserving (and ultimately sharing) the evidence of the breach, and notifying the affected parties and the appropriate official entities. Remedies for affected account holders will be dictated by the appropriate legislation and consumer protection laws. MoMo may or may not contract with a specialist to resolve issues related to a breach.

All of the above information will be contained in an Operations team policy document which includes the definition of roles and responsibilities for preventing data breaches and dealing with them when they occur. Anyone who is involved with the technical aspects of the system is required to read this document on joining the team, and any modifications to this document are circulated to all members of the team, including a requirement actively to confirm that they have read and understood the document.

MoMo takes the possibility of data breaches very seriously, and holds regular internal reviews of security procedures. Members of the technical team are given incentives for the discovery of potential security flaws in the system that might lead to data breaches. In addition, MoMo commissions external reviews of the security of the system, including so-called “ethical hacking” reviews.

MoMo will not rely solely on perimeter technologies to protect against data breaches but will also utilize safeguards to block malware and other strategies that might find access onto endpoints within the system.

5.16 Maximum Account Balances
The MoMo system does not support or allow credit. All account holders to the system are required to maintain a positive or zero balance in their accounts. If an account holder attempts a transaction which would result in their account balance going negative, then the transaction will be rejected and they will be sent a message explaining the reason for the rejection.

The MoMo system also supports transactions which enable account holders to move money from their external accounts to their MoMo accounts, as discussed in our original proposal. Since this is the case, it would be possible for a user to specify that their MoMo account was to be refreshed from their external bank account when required.

Whether or not this activity could be completed in a sufficiently short period to form part of the same transaction depends on the communication mechanisms with the external banking system which are in place. A more likely scenario in the first instance would be for the MoMo system to ask the account holder whether they wish to transfer money from their external account or not as part of the initial
transaction. If the user elects to make the transfer, they will be notified when the transfer has been completed, and will be able to re-try the original failed transaction at that point.

Either scenario would be supported by the MoMo system; the optimal solution would be selected when the system was deployed, and could be changed thereafter if and when a faster funds transfer mechanism was available.

5.17 Additional approval processes
The MoMo system has a number of ways of supporting additional approval processes where these are required. The system is highly configurable, and there is therefore typically more than one way of skinning the approval cat. The most commonly used ways are described below.

5.17.1 Approvals as part of a transaction
Where an approval is required as part of a transaction, MoMo’s workflow configuration capabilities allow business process designers to specify that a party to the transaction should be contacted and asked for explicit approval as part of a transaction (See Section 3.2.4 above.) For instance, a business head office might be asked to give its approval for a retail store to move more than a specified amount out of its commission account. The MoMo system will then contact the head office, using a configurable communication channel, and ask for approval. When the approval is given, information about when the approval is given and who gave it will be stored as a note against the transaction for use in auditing.

The amount of time this adds to a transaction will vary considerably, depending on the kinds of approval that are sought and the processes which govern the provision of the approval.

5.17.2 Linked transactions
If the likely elapsed time between requesting and obtaining approval is too onerous, then the transaction can be split into two, where the first transaction requests the approval and the second completes the transaction once it has been approved. In the example given in the previous section, the MoMo system might configure a transaction which requested approval from the head office for a transfer from the commission account, and a second transaction which completed the transfer once it had been approved.

The MoMo system also supports transaction conversion. This means that a transaction of one type can be converted into a transaction of another type if certain conditions are met. If a branch wants to transfer money from its commission account, for instance, it will simply request the transfer. The MoMo system will check the amount of the transfer requested and, if it exceeds the threshold which requires additional approval from head office, will convert the transfer request to an approval request. Transfers below the threshold will be processed as simple transfers.

It should also be mentioned here that, for auditing purposes, all transactions in the MoMo system record the rules that were applied when they were processed.

5.17.3 Accounts and Roles
There are some cases where the creditor (typically) of a transaction needs to perform an action before they can take advantage of the funds credited to them by the transaction. A simple example from the P2P world is where a MoMo account holder sends funds to someone who is not a MoMo account holder.
holder. When this happens, the recipient is set up in the system with an Unregistered Customer role and the funds are credited to their account. In order to make use of the funds, the user must register on the system, since the Unregistered Customer role is not allowed to perform any of the normal transactions by which MoMo account holders make use of their funds. Once they are registered and have the Customer role, the funds are available to them.

The same functionality can be used for business approvals. Transactions can be made to accounts controlled by a specific role, and the funds only unlocked when the business obtains another role. For instance, a business can send money to another business which is contingent on the recipient business obtaining a specific role based on their credit status.

5.17.4 Fast learning
The role-based model used by the MoMo application, combined with the flexible workflow configuration facilities, allow conditional approvals to be specified. If a user must have a given role to perform a transaction, then an additional step can be inserted into the workflow to obtain the approval if the user does not have the role. Once the role is obtained, the approval is no longer required. The MoMo model also allows roles to be expired, so regular re-approval plans can be specified as well.

In addition, the application checks to detect and prevent duplicate transactions — for instance, where a user mistakenly presses the send button twice.

The MoMo system will undertake velocity analysis of transactions passing through the system, and alert the customer care team if anomalies are found. In the first instance, higher level analytics will be provided by a third party. MoMo will look to insource this activity as transaction volumes increase and the logistics of external analysis become more difficult. However, we will continue to use algorithms developed by experts in the field rather than look to develop our own.

5.18 Microsoft Azure SLA
The architectural structure of the application is designed to make it resilient to the failure of any single component. As a consequence, the emphasis for the infrastructure SLA shifts from the prevention of failure to the time taken to recover from it. The implementation of a cloud-based infrastructure to support the MoMo application has the following positive consequences.

- First, it enables MoMo to take advantage of the expertise and experience in resilience, security and privacy of the cloud infrastructure provider, who is the expert in the field. The Azure service meets all available standards for security, data privacy and availability (see https://www.microsoft.com/en-us/trustcenter/Compliance.) Nevertheless, the MoMo implementation takes further steps to avoid some of the risks that can be associated with cloud infrastructures.
- Second, it means that all components of the system are virtualized, and can therefore be replaced much more quickly than would be the case for physical components.
- Third, the Azure service allows clients to specify the location of their data. This allows MoMo to host the failover components of their system in widely separated geographic locations, thus further reducing the chances that an infrastructure failure will take out the failover components as well as the front-line components.
For all areas of the solution, we need to apply the general terms shown in the table below while at the same time our configuration and use of the cloud services aim to improve on these levels using the remedies described. These remedies are discussed in more detail in the relevant section of the original proposal.

<table>
<thead>
<tr>
<th>Service</th>
<th>Monthly Uptime Percentage</th>
<th>Escalation</th>
<th>Penalty</th>
<th>Maximum Outage per month</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloud</td>
<td>99.95%</td>
<td>&lt; 2 hours</td>
<td>10%</td>
<td>22 minutes</td>
<td>Multiple access points to minimize chances of unavailability</td>
</tr>
<tr>
<td>Virtual Machine</td>
<td>99.95%</td>
<td>&lt; 2 hours</td>
<td>10%</td>
<td>22 minutes</td>
<td>Machines distributed across multiple geographic regions to minimize chances of unavailability</td>
</tr>
</tbody>
</table>
| Database    | 99.99%                    | < 2 hours  | 10%     | 4.5 minutes              | • Databases replicated across geographic regions  
|             |                           |            |         |                          | • Transactional data local to processes  
|             |                           |            |         |                          | • Transactional data supported by caching, allowing caches to buffer writes until storage is available again |
| Storage     | 99.99%                    | < 2 hours  | 10%     | 4.5 minutes              | • Databases replicated across geographic regions  
|             |                           |            |         |                          | • Transactional data local to processes  
|             |                           |            |         |                          | • Transactional data supported by caching, allowing caches to buffer writes until storage is available again |
| Backup      | 99.9%                     | < 2 hours  | 10%     | 44 minutes               | Regular transaction log backups ensure that point-in-time restores continue to be possible even if database backup points are missed |

The SLAs governing these services are publicly available at the following locations:

<table>
<thead>
<tr>
<th>Service</th>
<th>Location</th>
</tr>
</thead>
</table>
### Azure Services

<table>
<thead>
<tr>
<th>Service</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage</td>
<td><a href="https://azure.microsoft.com/en-gb/support/legal/sla/storage/v1_1/">https://azure.microsoft.com/en-gb/support/legal/sla/storage/v1_1/</a></td>
</tr>
<tr>
<td>Backup</td>
<td><a href="https://azure.microsoft.com/en-gb/support/legal/sla/backup/v1_0/">https://azure.microsoft.com/en-gb/support/legal/sla/backup/v1_0/</a></td>
</tr>
</tbody>
</table>


The Microsoft Azure platform is designed to work in partnership with experienced operations teams from the client, rather than providing the single, one-size-fits-all functionality of some other hosting providers. The platform offers an extensive range of possibilities to support performance, resilience and business continuity (see, for instance, the resources collected at [https://azure.microsoft.com/en-us/documentation/articles/resiliency-technical-guidance](https://azure.microsoft.com/en-us/documentation/articles/resiliency-technical-guidance)). Ultimately, however, the performance and resilience of a particular system is the responsibility of the operations and technical teams who run the system. The MoMo application has been architected to provide performance and business continuity in the context of a cloud environment, and the Microsoft Azure offering has been reviewed by the MoMo senior technical team and verified as providing the functionality that MoMo requires in order to operate its service reliably and with high performance.

The following is an outline of some key components that will be considered for any Service Level Agreement (SLA) within the Cloud Service Agreement. It describes at a high level the levels of service required, using various attributes such as availability, serviceability or performance.

Azure has been selected as an initial Cloud Service Provider; however, as the Platform grows, then the selection of key Premium Cloud Service Providers will be undertaken. There is an expectation to move to multiple cloud providers when reaching extreme scale to ensure maximum availability while remaining focused on core service. The MoMo technical management team have experience of large-scale migrations of this type, which have successfully migrated large-scale operations between platforms with minimum outage.

Outline criteria for SLA selection are given below.

#### 5.18.1 Critical Data Policies:
- Data Preservation and Redundancy
- Data Location
- Data Seizure
- Data Privacy
- Data Availability

#### 5.18.2 Critical Performance Objectives:
Availability and Response time covering as a minimum:
- **Hardware**: computers (CPU and memory), networks (routers, firewalls, switches, network links and interfaces), storage components (hard disks), and any other physical computing infrastructure elements
- **Facilities**: heating, ventilation and air conditioning (HVAC), power consumption and dissipation, communications, backup, and other aspects of the physical plant.

### 5.18.3 Auditing
- Provide you with an unbiased assessment of your ability to rely on the service provided
- Assess the depth and effectiveness of the provider’s internal systems and measures
- Provide tools to compare quality levels with other competing providers
- Ensure the openness needed to allow continuous review and improvement
- Uncover issues in your own organization’s ability to interface with the provider and provide uninterrupted services

### 5.18.4 Monitoring & Reporting
- **Cloud Performance Management**: This domain focuses on the response times for systems within the cloud architecture and between the cloud and the target user systems.
- **Peak Load Performance**: This domain focuses on measurements and timings for when the cloud is under stress, either intentional or unintentional. As systems can perform differently when under different loads, and the interactions and dependencies of a complex cloud are often unknown in advance, it’s important to visualize data both in a steady state as well as under load.
- **Hybrid and Inter-Cloud Performance**: As many clouds consist of different subsystems, often sourced from different cloud providers, it’s critical to visualize data about the interactions between those hybrid cloud components.
- **Application Performance**: This domain focuses on the applications executed from the cloud, particularly internal processing benchmarks as well as end-user experience measurement.
- **Problem Notification**: This domain focuses on monitoring and reporting on failures and issues with the cloud system. Addressed are issues with prioritization, notification and severity level assessment.

### 5.18.5 Measurement and Metering
- Assurance of accurate billing, and a methodology for handling objections or challenges to any automated metered billing
- The ability to segregate different services into different methods of billing: for example, performance testing, analytics, security scanning, backup, and virtual desktops might all be measured differently and metered separately.
- Ability to handle taxation issues from geography to geography, and from user to user. As each country and municipality has implemented different approaches to taxation of online commerce, your provider must be able to discern between these sources of use and meter them independently.

### 5.18.6 Provisioning
- Core provisioning speed. As part of a CSA, there should be baseline expectations of the speed of deployment of new systems, new data, new users, new desktops or any function that’s core to the service provided by the cloud vendor.
• Customization. It’s unusual that any templated method of rapid provisioning can be used “out of the box” without configuration and customization. Without careful management of the expectations and contractual levels for this function, any savings gained by automated rapid provisioning can evaporate in the face of delays in customizations post-deployment.

• Testing. Important to any strong CSA are provisions for testing automated deployment and scaling prior to need. This is particularly acute in areas where provisioning is employed in disaster recovery or backup situations.

• Demand Flexibility. It does no good to have a technical solution to rapid provisioning if the system is incapable of dynamic de-provisioning to match downturns in demand.

5.18.7 Upgrades & Patching

• Responsibility to develop requested changes: There should be a clearly defined responsibility set for which party is in the lead for different types of upgrades. For example, if the upgrade is dependent on many subsystems or people internal to an organization, not in the cloud, it might be advisable to center the responsibilities on the contracting organization vs. the cloud provider. On the other hand, if the majority of the upgrade happens with cloud-provider personnel within the cloud space, it’s likely the provider would assume primary responsibility.

• Process for identifying a timeline to develop, test and implement the change: There must be a clearly defined “chain of command” and project plan for all changes made to the cloud environment, properly resourced and timed to ensure reasonable contingencies and problem resolution. Here too, little is different regarding a cloud solution vs. a traditional IT solution, with the exception of the increased anxiety and scrutiny that the cloud draws today. This is in many ways simply a special case extension of change management policies which should already be in place.

• Process for resolving problems resulting from change: Since problems can often be compounded and result from multiple factors both within and outside the cloud, a CSA-based outline of upgrade procedures must include a clearly defined set of responsibilities and methods for resolving issues introduced by any upgrade.

• Back-out process if the changes cause major failures: Even the best-laid plans often run aground on the rocks of reality. Cloud service providers should automatically embed rollback checkpoints throughout an upgrade plan in order to “pull the plug” and restore any upgrade to its initial state should an unexpected and unsolvable problem crop up during the upgrade procedure. Throughout the process, regular communication meetings should occur to keep both parties in sync.

5.19 Real-time analysis of fraudulent transactions

As stated in the original proposal, MoMo intends to use a third party analysis service in the first instance to analyze its transaction patterns and to alert the company to any potentially suspicious activity. At a later stage, MoMo will look to bring this activity in-house, though we are likely still to want to use third-party tools to perform the analysis: the main driver for this is the amount of transactional data that will need to be analyzed and the consequent bandwidth that will be required to transport it. MoMo will not, of course, contract with any third party unless sufficient security guarantees are made to ensure the security and confidentiality of the data being analyzed.
A number of such services exist, and MoMo has not yet made a decision to partner with a particular service provider. No information is therefore available at present on the partner or, *a fortiori*, on the transport methods to be used to communicate with that partner, other than to confirm it will be a secure transport method that ensures standards on data protection will be met.

5.20 Handset encryption

Data is encrypted using the handset’s own encryption methods, if possible. For each operating system that the application supports, the encryption methods are reviewed and tested for robustness. If the tests are passed, then the operating system’s methods are used. Otherwise, the best available third party library is used to provide encryption.

Some further points are worth making:

No financial or user data is stored on the handset, or locally on any device that an account holder may use to attach to the system, except for an encrypted copy of the account holder’s most recent transaction receipts, which is stored locally to support multi-part transactions and the retrying of transactions. All other financial information, and all user information, is stored centrally in the application’s data store.

A detailed system of conversation and session tokens is used to make sure that information cannot be abstracted from its position in a conversation between the user and the application and re-used maliciously by third parties (so-called “man-in-the-middle” attacks.)

5.21 Personally Identifiable Information (PII)

Users can enter and change their PII using a series of menus on the application. The only exception to this is the unique items of information such as Social Security Numbers which are used uniquely to identify account holders in the system. These can be changed (for instance, if they have been entered in error,) but account holders must do this via the call center, to ensure that the integrity of the application is not violated.

In addition, account holders may use these menus to change the privacy settings on their PII overall, or on individual items of PII data. These settings can be used to bar access to items of personal information for:

- Call center staff
- Third parties
- Other account holders
MoMo registration and authentication

Process description
The registration process

- Identification: who am I?
- Corroboration: am I who I say I am?
- Amplification: what else do you need to know?
- Authentication: which methods do I want to use?
- Registration
- Verification: do I meet the criteria to be a MoMo subscriber?
Identification

• At least one unique identifier (UID) is required, though more may be supplied

• A UID is guaranteed to be unique across a MoMo implementation. The following UIDs are supported:
  • A Tax Identification Number, defined as either:
    • Social Security Number (SSN)
    • Employer Identification Number (EIN)
    • Individual Taxpayer Identification Number (ITIN)
    • Taxpayer Identification Number for Pending US Adoptions (ATIN)
    • Preparer Taxpayer Identification Number (PTIN)
  • A passport/visa
  • An MSISDN
  • An Email address

• Reference to Photo ID (required)
  • Driving Licence number
  • Passport number
  • State ID Card number
Where can I submit my identification?

• On a website
• At an agent, using their facilities
• From my handset, after downloading the MoMo application
Corroboration: data

• The following items of data are required to corroborate a UID:
  • Full name
  • Address
  • Date of birth
Corroboration: Process

- TIN verification
  - Regular expression check for format
  - Uses on-line verification for SSN using CBSV (Consent-based Social Security Number Validation) service
  - Checks SSN against name and supplied address

- MSISDN verification
  - Regular expression check for format
  - Uses HLR (Home Location Register) lookup to verify number
  - Supplements with name and address lookup where available

- Driving Licence
  - Uses DLV programme where states participate
  - Uses state DMVs where this is not the case

- Passport
  - Uses external validation service

- Email
  - Uses mail and response technique
  - Includes captcha to screen out automated attempts
Where can I perform my corroboration?

- On a website
- At an agent, using their facilities
- From my handset, after downloading the MoMo application
Amplification

• Additional items of data can be specified as required for registration
• Any items so specified will be required before registration is submitted
Where can I perform my amplification?

• On a website
• At an agent, using their facilities
• From my handset, after downloading the MoMo application
Verification
• Checks against OFAC and ONU lists
• Blacklisted customers cannot register
• Greylisted and PEP customers can register, but their transactions are monitored and reported
• Subscribers will need to either:
  1. Self-verify using photo ID and photograph of self; or
  2. Verify using photo ID at an agent.
Where can I perform my verification?

• On a website, if it’s hosted on a computer which provides photography capabilities
• At an agent, using my handset or the agent’s handset
• Using my phone, if it supports photography
Registration

• Requirements for registration:
  1. At least one UID must have been submitted and verified
  2. The minimum additional information must have been submitted
  3. The subscriber verification process must have been successful
  4. At least one authentication method must have been selected and verified
  5. The user must have assented to the terms and conditions under which individuals or businesses are accepted as MoMo subscribers
Authentication

• Registered customers can select one or more authentication methods from:
  • PIN (current)
  • Password (current)
  • Fingerprint (current)
  • Iris scan (proposed)
  • Certificate public key (proposed)

• New authentication methods can be added or removed by the subscriber as required.

• When transacting, any authentication method can be used, provided that it is:
  • Approved for that subscriber
  • Available on the channel through which the subscriber is accessing the system
Faster Payments QIAT

DRAFT ASSESSMENT

Proposer: Mobile Money Corp.

Summary Description of Solution:
The Mobile Money Corp. (“MoMo”) solution is a cash-based, closed loop solution that is targeted at the unbanked and underbanked. End users can fund MoMo accounts in the following ways:

- Receiving payments from disbursement organizations such as federal assistance programs through the MoMo system (funds move from organization’s legacy bank account to the corporation’s MoMo account, and then payments are transferred from the corporation’s MoMo account to individual recipient MoMo accounts)
- Salary payments through the MoMo system
- Transfers received from other MoMo account holders
- Remittances received from MoMo account holders located abroad
- Depositing cash through an agent network

MoMo account holders will use the funds in their MoMo account to:

- Pay bills (domestic bills such as utility bills)
- Send money to other MoMo account holders
- Withdraw cash from an agent location
- Buy goods at agents where MoMo payments are accepted

Consumer payments are routed using MSISDN (phone number), and business and government payments are routed using a business ID. The system approves transactions only if funds are available within the MoMo system.

The solution assumes that MoMo will have a Master Account with the Federal Reserve that reflects the activities between MoMo accounts in the system, and an account that handles all settlement activity within the solution. Within the solution, MoMo relies on double-entry accounting. Approval, clearing and settlement between MoMo accounts occurs in less than one second, and payers and payees receive payment notifications. The solution relies heavily on the GSMA Risk Management Tool Kit and the capabilities provided by Microsoft Azure solutions.

The solution also relies on a network of agents that register end users and provide cash-in and cash-out capabilities. The proposal anticipates end user growth through individual and bulk registrations, driven by business and government entities seeking alternatives to check payments and the use of MoMo by distributors to support payment by their customers. The proposal provides a detailed implementation plan that also considers cross-border payments. The solution has been deployed in El Salvador, and discussions are underway to deploy in Colombia.

EXECUTIVE SUMMARY OF THE PROPOSAL

- Major strengths
  - The solution is targeted at serving the unbanked and underbanked.
  - The solution is a clearly defined, closed-loop system. It relies on a simple settlement mechanism that relies on settlement accounts held at the Federal Reserve.
  - The proposal provides thoughtful responses regarding technology setup and legal arrangements.
The proposal clearly describes considerations for implementing the solution in the U.S. with various participant groups, drawing on lessons from existing implementations elsewhere. The proposal discusses expansion to additional markets (international capability) and transaction types (e.g., remittances).

### Areas for improvement and enhancement

- The solution leverages existing infrastructure. It does not rely on any aspect of Faster Payments other than to move funds between a legacy account and a MoMo account.
- The solution relies on agents (450,000 planned within 5 years in the U.S.) to support all transaction types and to manage opening of accounts for end users. It is not clear how the solution can scale to support a network of this size, and guarantee low pricing when leveraging cashing agents.
- The value propositions for end users and for agents are not clear.
- The solution would require substantial support from the Fed to make the necessary regulatory changes to support launch and settlement.
- The solution does not include details on a central authority, data management, DRP or BCP, or fraud management.
- The authentication process relies on PIN, with no description of a process to add new authentication capabilities.
- It is not clear from the proposal whether the solution can deliver its full value proposition for all major use cases (e.g., B2B).

### Use cases addressed


### Proposer’s overall ability to deliver proposed solution

- The solution is well designed and the proposer has been diligent in addressing the criteria. The solution has been implemented in El Salvador, which demonstrates that the design is viable in practice.
- The solution has been described in detail. There are a few concerns related to dependencies and assumptions that are described in the proposal. The first dependency is that the Federal Reserve Bank will authorize MMC to open and maintain Federal Reserve Accounts. These accounts will be instrumental to support settlement as designed. Alternatively, MoMo may become a chartered DI. It will be the Federal Reserve’s decision whether to support this option. A third option would see the MoMo entity established by new federal legislation to enable the MoMo system. Without accounts at the Federal Reserve, the potential risks may make the solution unviable.
- The solution’s success is also reliant on building out a large agent network (450,000 locations in five years). This network will be required to support unbanked or underbanked end users. There are concerns about the capability of these agents to authorize end users at enrollment and in the deposit and withdrawal of funds to and from the MoMo system. Training this large network and monitoring and managing performance will be challenging.
ASSESSMENT

Ubiquity

U.1 Accessibility

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

Rationale:

MoMo’s mission is to increase financial inclusion for the unbanked and underbanked. The solution has the capability to support business and individual end users, both banked and unbanked. It is cash-based; users can fund their MoMo account with a cash deposit, payment from a MoMo subscriber, payroll, benefit or remittance payments, or transferring funds from an existing bank account (Fedwire; real time networks when available) (U.1.1). Funds can be withdrawn through MoMo’s agent network, participating ATM networks or by transferring funds to an existing bank account. Funds can be transferred from one MoMo account to another quickly and reliably. The solution supports multi-currency payments, but does not describe how cross-border settlement will occur through the MoMo account held at the Fed. The initiator must approve each transaction for it to proceed. The proposal anticipates growth via new user registration, either as individuals or in ‘bulk’ through a business or government agency (U.1.4). Account registration includes the KYC requirements for the jurisdiction where the solution is implemented.

End users must have either a smart phone, feature phone, or Internet access in order to participate in MoMo (U.1.2). Payments are routed based on MSISDN (U.1.2). To support the movement of money to/from existing bank accounts, MMC will have to open accounts with the Fed: the ability to open these accounts is a significant assumption in the proposal.

MoMo offers APIs to support the addition of new services or providers. The proposal states that MoMo payments are more affordable than traditional payment mechanisms. Details of the economics are not provided.

U.2 Usability

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

Rationale:

End users can cash out payments at a network of agents (smaller retailers). To do so, they must request a bar code voucher from the system and present that voucher to the agent for approval. Once the voucher is approved, the agent can dispense cash to the end user (U.2.1). The solution is a closed loop system and is available 24/7/365 (U.2.3). The mobile app (B4P) and internet app allows subscribers to see their current balance. The registration process requires at least one unique identifier, which can be a tax identification number, a passport or visa, a cell number (MSISDN) or an email address. It is the assessors’ understanding that payments can be routed using any one of these unique identifier aliases. The solution is available in multiple languages, and there is a call center with agents that can support end users (U.2.4). The solution supports the iOS and Android operating systems; feature phones using Java; and the Internet.

Users must be connected to the cell phone network or internet in order to confirm payments. Interactions with existing account infrastructure to fund MoMo accounts are managed through Fedwire; thus, the availability of Fedwire and other supporting networks may impact such interactions, and associated risks will need to be managed.
U.3 Predictability

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale:**

The solution is effectively a closed loop solution and can operate independently. The solution provides an app to end users to deliver a consistent experience across mobile devices. Functionality is consistent across mobile and internet channels with the exception of authentication options (some options are available only on the mobile device – for example, biometric authentication). The Payment System Rules are developed based on the laws relating to financial systems in the country where the system is deployed. These rules should be fully supported by government. MoMo adopts the rules once they have been reviewed and approved by government and central bank regulators.

MoMo will work closely with the CFPB to ensure that dispute processes are fair and complete. The proposal states that the dispute process will follow local regulations including Regulation E, including disputes arising from transfers between MoMo and depository institutions and FIs. Terms and conditions for the MoMo system will be available to all account holders, and notification will be provided for any changes. The dispute process is described at a high level within the proposal, with SLAs provided for the resolution of all complaints.

U.4 Contextual data capability

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale**

The proposal states that for transactions where all accounts are MoMo accounts, minimal contextual data is required because the relationship between account holders and the nature of the transaction are well understood (U.4.1). This may not be a valid assumption, especially as B2B payment use cases are added and as the number of end users and transactions increases (U.4.2).

For transactions involving non-MoMo accounts, the solution will supply contextual data based on the requirements of the transfer mechanism used. Interactions with third parties that require party-specific types of information to be added as part of the transaction (e.g. invoice number) can be added to the MoMo system as all information types are configurable. The proposal indicates that the solution will map all data types onto ISO20022 data structures for communication with external providers, including government entities, FIs, PSPs and third-party service providers. Until these providers are ISO20022-ready, the solution will use existing interfaces.

U.5 Cross-border functionality

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>
Rationale:

The proposal describes enabling cross-border capabilities through MoMo-to-MoMo transfers, and through partnerships with mobile money operators in other markets (U.5.1). The solution identifies recipients of cross-border payments by MSISDN. The solution provides the initiator with all details on transaction and FX fees for approval prior to the transaction (U.5.3). The FX provider guarantees transfer of funds to the payee system, which then transfers funds to the recipient’s account. It is not clear in the proposal if this approach would require foreign banks to open accounts with MoMo, to perform the FX and to act as a local settlement agent. It is not clear how settlement in multiple currencies will be supported by MoMo’s settlement account at the Fed. Additional details regarding the introduction of cross-border capabilities will support a more robust evaluation.

Where MoMo interacts with a third party to support remittances to another country and that third party does not have a recognized communications API to support the transaction, the ISO20022 standard will be used to support these transfers. This will ensure that new interfaces do not need to be created, and will allow the third party to re-use the interface to communicate with other organizations.

MoMo is currently operational in El Salvador. The company is focused on addressing the needs of the U.S. remittance market.

U.6 Applicability to multiple use cases

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

Rationale:

The proposal states that it intends to address multiple use cases. However, the solution is heavily focused on the unbanked and underbanked. As a result, it may be challenging for the solution to generate volume with other use cases (e.g., B2B).

Efficiency

E.1 Enables competition

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

Rationale:

The solution provides pricing on a per-transaction basis, published and disclosed in advance (E.1.3). The UI uses APIs; changes to end user functionality are easily distributed to support the addition of third party services. Individuals, businesses and governments can all participate (E.1.4).

This solution targets the unbanked and underbanked and enables cash as well as non-cash payments. MoMo is the only provider of the solution; end users are required to enroll directly with MoMo (E.1.2). The solution’s success relies heavily on its capability to support MoMo account funding from any bank account (through Fedwire or an alternative real time, good funds network.).
MoMo is a closed financial system, and has a highly open and flexible model which supports the setup of third parties such as utility companies which are a critical component of MoMo’s financial inclusion strategy.

E.2 Capability to enable value-added services

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale:**
The proposal states that third parties can access the network to compete with the services that MoMo provides (p.115) or to offer additional services, such as payday loans, that MoMo does not offer. Transactions in the MoMo system are always between MoMo accounts. Any organization that wants to provide services through the MoMo system must open and maintain one or more MoMo accounts within the system. Because all transactions within MoMo are prefunded, risk is low. It is the assessors’ interpretation that FIs and other PSPs could leverage this solution to introduce payment capabilities for new products and services (E.2.1). MoMo will review all services prior to inclusion to ensure they comply with required legislation. Once approved, services are added to the MoMo menu system.

MoMo requires that a service must clearly state costs associated with the provision of the service. Costs must be described at enrolment for the service, and APIs can support quotations for service. MoMo end users will always be clearly shown what charges they are paying for a given transaction and will be provided with the opportunity to confirm or cancel the transaction.

E.3 Implementation timeline

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale:**
The solution’s implementation plan is comprehensive and based on MoMo’s implementation in El Salvador and developments in Colombia, as well as MoMo’s senior team experience. The main drivers for adoption will be the immediate availability of funds and reduced costs. Transaction costs are expected to be less than 2% of the value of the transaction. The solution’s success depends on building out the agent network; opening and maintaining multiple accounts at the Fed; and securing FI support for funding MoMo accounts from existing corporate bank accounts, ideally via real time networks. If barriers are presented to any of these assumptions, the implementation as described could be extremely challenged.

In creating an agent network, the focus is on creating agents where and when required to support end users. MoMo’s focus is to work with distributors who supply small businesses who can offer MoMo agencies as a product. Distributors will offer set up and training, and agents will earn commission on transactions provided to MoMo users. MoMo will also leverage B2B distribution networks focusing on larger distributors who can reach hundreds of thousands of retail establishments. Both the distributor and the retail businesses will become MoMo account holders.

The provider has been fully funded for the last six years; MoMo’s financial backers are committed to continued deployment over the next two years with a focus on operations in the
US and three other countries. The proposal states that revenues will be generated through fees charged to end users and to bulk payers such as government (E.3.1).

E.4 Payment format standards

<table>
<thead>
<tr>
<th>Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Effective</td>
<td>The solution uses its own proprietary message format. The proposal states that this format can be converted into other data formats, as the solution maintains an internal mapping to support standard data structures (E.4.1). These include structures used to interface with FedWire and CHIPS. The solution will support ISO20022 as it deploys more broadly.</td>
</tr>
<tr>
<td>Effective</td>
<td></td>
</tr>
<tr>
<td>Somewhat Effective</td>
<td></td>
</tr>
<tr>
<td>Not Effective</td>
<td></td>
</tr>
</tbody>
</table>

Rationale:
The solution uses its own proprietary message format. The proposal states that this format can be converted into other data formats, as the solution maintains an internal mapping to support standard data structures (E.4.1). These include structures used to interface with FedWire and CHIPS. The solution will support ISO20022 as it deploys more broadly.

E.5 Comprehensive

<table>
<thead>
<tr>
<th>Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Effective</td>
<td>Because this is a closed-loop solution, all aspects of the payment process are addressed (E.5.1). The solution is designed as a cash-based system. End users can fund MoMo accounts by making cash deposits; receiving payments from other MoMo accounts (personal and commercial accounts); or receiving payments from existing deposit accounts using FedWire.</td>
</tr>
<tr>
<td>Effective</td>
<td></td>
</tr>
<tr>
<td>Somewhat Effective</td>
<td></td>
</tr>
<tr>
<td>Not Effective</td>
<td></td>
</tr>
</tbody>
</table>

Rationale:
Because this is a closed-loop solution, all aspects of the payment process are addressed (E.5.1). The solution is designed as a cash-based system. End users can fund MoMo accounts by making cash deposits; receiving payments from other MoMo accounts (personal and commercial accounts); or receiving payments from existing deposit accounts using FedWire.

E.6 Scalability and adaptability

<table>
<thead>
<tr>
<th>Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Effective</td>
<td>Wherever possible, the solution leverages virtual machines and uses storage on the cloud. This design supports configuration changes on short notice to address volume changes. TPS variance can be addressed within 30 minutes (p.120) (E.6.2). The solution supports horizontal scaling - deploying the same code to multiple independent servers and balancing the load. This approach allows for new code to be introduced while the system is running, and new servers to be added with no impacts.</td>
</tr>
<tr>
<td>Effective</td>
<td></td>
</tr>
<tr>
<td>Somewhat Effective</td>
<td></td>
</tr>
<tr>
<td>Not Effective</td>
<td></td>
</tr>
</tbody>
</table>

Rationale:
Wherever possible, the solution leverages virtual machines and uses storage on the cloud. This design supports configuration changes on short notice to address volume changes. TPS variance can be addressed within 30 minutes (p.120) (E.6.2). The solution supports horizontal scaling - deploying the same code to multiple independent servers and balancing the load. This approach allows for new code to be introduced while the system is running, and new servers to be added with no impacts.

E.7 Exceptions and investigations process

<table>
<thead>
<tr>
<th>Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Effective</td>
<td>MoMo will be very transparent with its dispute management processes; Terms and Conditions will be available to all account holders through all channels. End users with a complaint can contact the MoMo support center 24/7. All actions will be documented, and all complaints will be resolved within 3 days. If the complainant is dissatisfied with the outcome, the issue can be directed to the CFPB. MoMo will continue to work with the CFPB to resolve the issue to conclusion. MoMo has a detailed and proven process in place in El Salvador that can be</td>
</tr>
<tr>
<td>Effective</td>
<td></td>
</tr>
<tr>
<td>Somewhat Effective</td>
<td></td>
</tr>
<tr>
<td>Not Effective</td>
<td></td>
</tr>
</tbody>
</table>

Rationale:
MoMo will be very transparent with its dispute management processes; Terms and Conditions will be available to all account holders through all channels. End users with a complaint can contact the MoMo support center 24/7. All actions will be documented, and all complaints will be resolved within 3 days. If the complainant is dissatisfied with the outcome, the issue can be directed to the CFPB. MoMo will continue to work with the CFPB to resolve the issue to conclusion. MoMo has a detailed and proven process in place in El Salvador that can be
leveraged and modified as needed for use in the US. MoMo invites regular review of its processes by the CFPB.

The solution provides notification of failed transactions (E.7.1). The solution does not provide notifications related to fraudulent transactions (E.7.1). The exceptions and investigations process is supported by the extraction of transactional data is from the application’s main data store into a separate data store which is available for subsequent analysis.

**Safety and Security**

**S.1 Risk management**

<table>
<thead>
<tr>
<th>Type</th>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rationale:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The MoMo solution is based on push payments and immediate settlement. This addresses liquidity, credit and settlement risk. There is a detailed ‘request reversal’ process that has been outlined in the proposal in the event that a payment is made in error. The solution is highly configurable and supports parameters related to account management and transaction management.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In the event that new code is required to address an event, the proposal states that MoMo can deliver new code in weeks. (S.1.3) From a settlement perspective, MoMo is a closed loop, pre-funded solution, and the debit and credit value transfer to support a payment occur simultaneously within the system (S.1.2) If any part of a transaction fails, the entire transaction is canceled. The sum of balances in the system should always be zero; the balance of MoMo’s internal control account should be opposite the balance of MoMo’s master account held at the Fed. A reconciliation process is run at regular intervals during the day to ensure alignment between the control account and the master account, with the master account being the authoritative source.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>End users are required to authenticate themselves at each session using a PIN (S.1.4). MoMo employs GSMA data security requirements to avoid any manipulation of data by a third party, and has developed risk controls based on the GSMA Risk Management Toolkit. New employees and agents in the MoMo system are required to complete training on social engineering fraud risk, KYC, AML and general fraud awareness (S.1.3). Market watch lists are monitored, updated according to the government Compliance Office schedules, and loaded onto the system within one week of receipt. Watch lists maintained by the UN and US government (OFAC) are carried out monthly.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In the event that an agent opens an account that proves to be fraudulent, there is no penalty if the agent followed procedures. These procedures are not outlined in detail in the proposal. If procedures were not followed, the situation is dealt with in consultation with the legal and regulatory authorities. Additional details on the monitoring and management of Agents would be helpful.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**S.2 Payer authorization**

<table>
<thead>
<tr>
<th>Type</th>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Effectiveness:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The solution provides payer authorization (E.7.2). The solution does not provide support for the reconciliation of payee and payor transactions (E.7.2). The exceptions and investigations process is supported by the extraction of transactional data is from the application’s main data store into a separate data store which is available for subsequent analysis.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Rationale:
MoMo is a closed-loop system. End users must authorize to the solution to initiate a session but are not required to authorize each transaction within a session (S.2.1). Authorization includes validation of the device as well as validation of the individual using a PIN, or biometric if available on, and supported by the mobile device. The solution allows end users to set up payments in advance based on defined parameters (payee, amount, date, recurrence) (S.2.2). Subscribers are asked to confirm the transaction before it is made, and can decide to cancel the transaction at that time (p.130) (S.2.3).

S.3 Payment finality

Very Effective        Effective        Somewhat Effective       Not Effective

Rationale:
The solution is pre-funded and supports only Good Funds payments (S.3.1). Funds are transferred between the payer and the payee in the same instance, and funds are available to the payee and become irrevocable when the transaction is completed (S.3.2).

The proposal provides details regarding a dispute process and a ‘request reversal’ process that are available to end users in the event that a payment has been made in error. Dispute processes are transparent, and all complaints will be resolved within three days.

S.4 Settlement approach

Very Effective        Effective        Somewhat Effective       Not Effective

Rationale:
MoMo is a pre-funded, cash-based solution. Settlement within the solution occurs in seconds with recipients having immediate access to funds. MoMo intends to hold Master Accounts for cash liabilities in the Federal Reserve to eliminate any settlement risk within the solution (S.4.1). Subscribers can transfer funds in/out of a MoMo account from/to a depository institution using existing industry capabilities. Timing of settlement of transfer transactions will depend on the system used for the exchange of funds. MoMo manages potential exposure related to the transfer of funds out of the system by holding the transactions in a state of suspense until confirmation of receipt of funds from the external system is received (S.4.2). Settlement between MoMo accounts and depository institutions will be in central bank money (S.4.3).

S.5 Handling disputed payments

Very Effective        Effective        Somewhat Effective       Not Effective

Rationale:
MoMo will be very transparent with its processes; Terms and Conditions will be available to all account holders through all channels. End users with a complaint can contact the MoMo support center 24/7. All actions will be documented, and all complaints will be resolved within 3 days. If the complainant is dissatisfied with the outcome, the issue can be directed to the CFPB.
MoMo will continue to work with the CFPB to resolve the issue. MoMo invites regular review of its processes by the CFPB.

MoMo has a detailed and proven process in place in El Salvador that can be leveraged and modified as needed for use in the US. The solution can block funds, freeze accounts and close accounts as necessary (S.5.1). The proposal states that the solution has policies and procedures that protect payers that reflect local laws and regulations, including Regulation E. (S.5.4). The proposer states that these procedures should reasonably protect business, government and consumer payers (S.5.4).

S.6 Fraud information sharing

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale:**

The solution supports the capture and storage of all transaction-related information. The proposal states that a central repository capability may perform the storage and aggregation of this information (S.6.6). The solution will provide appropriate information in each case of shared fraud information; PII will not be shared (S.6.1). The solution will meet Consumer Protection law requirements regarding data protection. MoMo does not currently aggregate and analyze transaction data in real time to identify fraudulent transactions, but would consider using a third party to do so.

S.7 Security controls

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale:**

The solution is hosted by Microsoft Azure and leverages Microsoft capabilities to provide audit and geographic redundancy. Intrusion risk as addressed by a checkpoint solution; layering architecture is used to protect data from intruders, and there are no direct connections between public-facing machines and the MoMo database. Session data is encrypted using HTTPS, and commercial solutions require additional authentication of the user. VPN setup is also supported where transaction volume or value requires additional security. User passwords and PINs are stored in an encrypted form. Stored transaction data is also encrypted and can be stored beyond the 7 years required by the SEC. Access to servers is only permitted through remote desktop connections, and all sessions are recorded. Backups of all data are taken daily and stored offline. Transaction logs are also stored offline. Overall performance is monitored across the entire system using a tool (New Relic APM) that uses an automated escalation process to send alerts to the MoMo Operations Team.

It is not clear from the proposal whether the solution provides a minimum requirement for device security. Handset data is encrypted using capabilities available on the handset, but it is not clear whether there are minimum requirements for this. No financial or user data is stored on the handset. A given MSISDN can only be registered to one user. An applicant is not required to prove that they are the registered owner of the handset.
S.8 Resiliency

**Very Effective**

**Effective**

**Somewhat Effective**

**Not Effective**

**Rationale:**

The proposal states that target availability for the solution is 100%, (S.8.1) and that the system can continue to run while updates are installed. The solution is architected to separate areas of the system that have different functions to provide resiliency against the failure of any single component (S.8.4). The solution supports horizontal scaling in all areas. The solution will be hosted on MS Azure, which delivers data security and privacy, control and transparency through the management of secure, multi-factor authentication to provide access to the environment, data, and applications, industry level encryption, security, and threat protection. It is the assessors’ interpretation that MS Azure will provide Business Continuity and Disaster Recovery and DRP under SLA (S.8.2). The proposal does not describe systemic impacts in the event of an outage; because the solution is closed-loop, these are minimal. (S.8.3)

The solution allows for 25% redundancy to accommodate volume spikes rather than the FPTF criteria for a 40% buffer. It has been MoMo’s experience that 25% capacity overhead, measured against average transactional maximums over the busiest minute of a day, is sufficient.

S.9 End-user data protection

**Very Effective**

**Effective**

**Somewhat Effective**

**Not Effective**

**Rationale:**

Personal information is stored in an encrypted form in a Microsoft Azure-provided database; no PII travels as part of the payment (S.9.3). Data at rest is protected by Microsoft’s Transparent Data Encryption (TDE) algorithm which is compliant with many laws, regulations and guidelines across several industries. Access to customer data is controlled using a role-based security model, and all sessions are tracked.

S.10 End-user/provider authentication

**Very Effective**

**Effective**

**Somewhat Effective**

**Not Effective**

**Rationale:**

Agency authentication (in person) requires the end user to show a form of national ID, which is captured as part of the registration process (S.10.5). The solution screens the applicant using AML/KYC/PEP lists, and other defined lists as appropriate. To ensure that the applicant is in possession of the device with the MSISDN, the application registration process sends an SMS message containing a PIN, which must be entered to activate the mobile app. The proposal does not clarify whether the process is the same for an Internet-based end user. In the transaction flow, session initiation requires the entry of a PIN. Initiators are asked to enter the recipient’s phone number twice to ensure the payment is routed to the right person (S.10.2). If the recipient does not have a MoMo account, the system will set up an unregistered account; to receive funds, the recipient must either register with MoMo (via an agent or online) or route the money through another Mobile Money system. Agent terminals that connect over the Internet are required to use a 2048-bit client certificate to provide an additional level of authentication.
Authentication options are updated by adding the data type to the system and by specifying its membership of the Authentication Options group. Authentication options are expired and removed from the Options group. All impacted account holders are notified in advance and recommended to sign up to new methods of authentication.

S.11 Participation requirements

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale:**
Participants include end users, corporations who wish to pay end users, and agents who provide services for end users.

End user participation requirements are determined by the registration process. The proposal provides a list of unique identifiers that can be submitted through a website, a phone with a camera or a PC with a camera or presented in person at an Agent location. Because the solution operates on a pre-funded construct, no credit check is required. End users who are blacklisted on OFAC or ONU lists cannot participate; end users who are grey listed are closely monitored and their transactions are reported.

MoMo has a commercial team that negotiates directly with large companies that wish to participate in the system. No minimum requirements are described for government or corporate entities that wish to join the system.

The solution relies on an Agent network. Agents accept payments, register customers, take deposits and pay out withdrawals. Because MoMo is a good funds model, no credit check is required for Agents who wish to participate in the network. Agent compliance with requirements will be monitored and managed. No minimum requirements are described for Agents that wish to participate in the system.

**Speed (Fast)**

**F.1 Fast approval**

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale:**
The solution is a pre-funded closed-loop solution that supports transaction approval in less than one second.

**F.2 Fast clearing**

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>
Rationale:
The solution is a pre-funded closed-loop solution that supports transaction clearing in less than one second. The proposal does not describe impacts on transaction times that may occur in use cases involving billers where end user account validation is required prior to payment approval.

F.3 Fast availability of good funds to payee

| Very Effective | Effective | Somewhat Effective | Not Effective |

Rationale:
Funds are immediately available to the recipient once a transaction is finalized, typically within one second of the payer confirming the transaction. When the transaction involves a bill payment to a business user, funds are held until the biller responds to the payment request. The funds are ‘available’ once the payer confirms the transaction, but are not received until the recipient acknowledges the account.

F.4 Fast settlement among depository institutions and regulated non-bank account providers

| Very Effective | Effective | Somewhat Effective | Not Effective |

Rationale:
The solution is a pre-funded closed-loop solution; funds are exchanged within the solution. Any interaction with depository institutions is related to moving funds into and out of a MoMo account. Settlement of these transactions will rely on the capabilities of the system being used to transfer the funds.

F.5 Prompt visibility of payment status

| Very Effective | Effective | Somewhat Effective | Not Effective |

Rationale:
Transactions within the MoMo system clear and settle in less than a second. The payer receives a notification that the account has been debited, and the payee receives a notification that the account has been credited and funds are now available.

Legal

L.1 Legal framework

| Very Effective | Effective | Somewhat Effective | Not Effective |
Rationale:
The proposal provides a very thorough response to this section. The proposal considers possible scenarios, and which laws and regulations will apply to each scenario (L.1.1). Applicable laws and regulations will be considered in creating the solution’s comprehensive Terms and Conditions.

L.2 Payment system rules

<table>
<thead>
<tr>
<th>Rating</th>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

Rationale:
The rules governing payments in the MoMo system are developed initially by the MoMo organization. They are then reviewed by the relevant government and central bank regulators. Once approved, the rules are adopted by MoMo.

The solution’s Terms and Conditions will include requirements, standards/protocols and procedures that govern the rights and obligations of end users, the MoMo entity and any third party agent or service provider involved in the provision of the MoMo service (L2.1.). These T&Cs must be agreed upon prior to sending and receiving payments through the MoMo system and will address all aspects of the solution. It is the assessors’ interpretation that MoMo will retain legal liability and responsibility for the solution.

L.3 Consumer protections

| Rating          | Very Effective | Effective | Somewhat Effective | Not Effective | Not Assessable |
|-----------------|----------------|-----------|--------------------|---------------|

Rationale:
The solution supports pre-funded, good funds payments inside a closed-loop network. No transactions are approved unless funds are available. The proposal states that MoMo end users will be protected by the EFTA and Regulation E, including liability protection in the event of fraudulent and erroneous payments (L.3.1). The dispute process is well documented in the proposal and relies on the engagement of the CFPB. It will be possible for MoMo to implement additional consumer protections if/as needed (L.3.3).

L.4 Data privacy

| Rating          | Very Effective | Effective | Somewhat Effective | Not Effective | Not Assessable |
|-----------------|----------------|-----------|--------------------|---------------|

Rationale:
The proposal states that MoMo will be subject to the Gramm-Leach-Bliley Act, and perhaps also to Regulation P if designated as a depository institution, and that it will meet all pertinent data privacy requirements (L.4.1). The proposal states that MoMo will be transparent about describing what end user information it captures and how that information will be used and shared (L.4.2). Registration for a MoMo account will require name, address, telephone number, and government-issued ID if registering at an Agent location (L.4.3).
Users can enter and change their PII using a series of menus on the application. The exception is unique items of information such as a SSN, which are used uniquely to identify account holders in the system. Account holders can also use menus to change their privacy settings to limit access by call center staff, third parties, and other account holders.

**L.5 Intellectual property**

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale:**

The proposal describes an IP due diligence review to will take place in the future. It states that MoMo will obtain patent, trademark, copyright, trade secret and other intellectual property protection for the MoMo system. MoMo has engaged specialist legal firms in the areas of U.S. IP and trademark law. A review will be conducted to ensure that MoMo’s rights to use all areas of its offerings are beyond legal challenge in the US. This process was also followed in El Salvador.

**Governance**

**G.1 Effective governance**

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale:**

Key aspects of governance have not yet been defined. MoMo expects to leverage governance learnings from the implementation in El Salvador where governance practices are being developed and modifications are being developed and implemented as they become necessary. MoMo will establish a Board of Directors that will be supported by a Committee that will develop and manage the T&Cs that support the solution.

**G.2 Inclusive governance**

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale:**

The Committee that will be established to manage solution T&Cs is expected to include one or more User representatives. Subject matter counsel will be retained to ensure that T&Cs conform to applicable U.S. law. The Committee will be authorized to establish Advisory Groups as needed that will include end users and/or other stakeholders to advise the Committee on matters relating to T&Cs.
### APPENDIX A: ASSESSMENT SUMMARY

= QIAT Assessment  = Proposer Self-Assessment

<table>
<thead>
<tr>
<th><strong>UBIQUITY</strong></th>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.1: Accessibility</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.2: Usability</td>
<td></td>
<td>✔️</td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.3: Predictability</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.4: Contextual data capability</td>
<td></td>
<td>✔️</td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.5: Cross-border functionality</td>
<td></td>
<td></td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>U.6: Multiple use case applicability</td>
<td></td>
<td></td>
<td>✔️</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>EFFICIENCY</strong></th>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
<tbody>
<tr>
<td>E.1: Enables competition</td>
<td></td>
<td></td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>E.2: Capability to add value-added services</td>
<td></td>
<td></td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>E.3: Implementation timeline</td>
<td></td>
<td></td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>E.4: Payment format standards</td>
<td></td>
<td>✔️</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E.5: Comprehensive</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E.6: Scalability and adaptability</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E.7: Exceptions and investigations process</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>SAFETY AND SECURITY</strong></th>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.1: Risk management</td>
<td></td>
<td>✔️</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S.2: Payer authorization</td>
<td></td>
<td>✔️</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S.3: Payment finality</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S.4: Settlement approach</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S.5: Handling disputed payments</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S.6: Fraud information sharing</td>
<td></td>
<td></td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>SAFETY AND SECURITY (cont’d)</td>
<td>Very Effective</td>
<td>Effective</td>
<td>Somewhat Effective</td>
<td>Not Effective</td>
</tr>
<tr>
<td>------------------------------</td>
<td>----------------</td>
<td>-----------</td>
<td>--------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>S.7: Security controls</td>
<td>○</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S.8: Resiliency</td>
<td>✓○</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S.9: End-user data protection</td>
<td>✓○</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S.10: End-user/provider authentication</td>
<td>○</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S.11: Participation requirements</td>
<td></td>
<td>✓○</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SPEED (FAST)</th>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
<tbody>
<tr>
<td>F.1: Fast approval</td>
<td>✓○</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F.2: Fast clearing</td>
<td>✓○</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F.3: Fast availability of good funds to payee</td>
<td>✓○</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F.4: Fast settlement</td>
<td></td>
<td>✓○</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F.5: Prompt visibility of payment status</td>
<td>✓○</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LEGAL</th>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
<tbody>
<tr>
<td>L.1: Legal framework</td>
<td>✓○</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L.2: Payment system rules</td>
<td>○</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L.3: Consumer protections</td>
<td>✓○</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L.4: Data privacy</td>
<td></td>
<td>✓○</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L.5: Intellectual property</td>
<td></td>
<td>✓○</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GOVERNANCE</th>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
<tbody>
<tr>
<td>G.1: Effective governance</td>
<td>○</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G.2: Inclusive governance</td>
<td>○</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX B: PROPOSER RESPONSE TO QIAT ASSESSMENT

Areas for improvement and enhancement

1. The solution will leverage any enhancements in Faster Payments bring the improvements to the movement of funds between legacy and MoMo Accounts, but not being dependent on the Faster Payments provides agility and speed in bringing the solution to market more quickly.

2. Distributed organizations in the internet era with greatly improved forms of communications address some of the challenges of pre-internet business, the team is confident the logistics are viable.

3. On the value proposition for end-users and agents, below is a summary of the benefits in general for participants and for particular actors.

**MoMo General Value Proposition for Participants**

Ground up design of system results in low fixed cost base. This allows MoMo to provide a service with no costs to consumers outside of inexpensive transaction-based fees. This provides access to the financial system for anyone who can pay the transaction fee, or who receives funds from someone who can pay the fee.

- No credit history or fee required for account opening.
- Cashless transactions decrease possibility of theft and fraud.
- Good money available in all cases in your MoMo account virtually instantaneously.
- Clear statement of costs associated with transaction before the transaction is performed.

**MoMo Account Holders**

- Financial Inclusion for the Unbanked and Underbanked
- Flexibility as to mobile device type and MSO provider
- No credit check required for account opening. Inability to overdraw MoMo account leads to development of clean credit history.
- MoMo system available 365/24/7 on user’s mobile device. Statistics show mobile device penetration ubiquitous.
- MoMo ecosystem will include providers of goods and services, including bill pay such as Utilities, Phone and Insurance available on the device’s menu.
- Cashless payments and transfers decrease possibility of personal risk, theft or fraud.
- P2P and P2B (Retail purchase) transfers variably priced making them affordable at low dollar amount levels.
- Standard costs for conversion between cash and e-money
- Facilitates transition from cash to online payments

**Government and Business Bulk Payments**

- Monthly payment of Subsidies, Benefits, Payrolls
- Alleviates the need to offer multiple distribution channels of funds such as collection of cash at specific physical locations, funded credit or debit cards, bank check or direct deposit to traditional bank account and still achieve blanket population coverage.
- Simplifies cash handling, reconciliation and accounting
- Recipients receive good money virtually instantaneously with no need to travel to an inconvenient physical location, pay to cash a check, or support a bank or card account.
Business to Business

MoMo’s agent acquisition model includes the use of retail goods distributors (Super Agents) to acquire and train their retail customers (consumer facing retail outlets) as MoMo agents.

Merchants and Super Agents
- Payments for wholesale goods delivered.
- Consolidation of payments methods.
- Minimize theft and fraud through cashless transactions. Convenient alternative to C.O.D. and Just-In-Time
- No credit exposure during billing cycle.
- Avoid costly merchant card fees.
- Earn commission on agent services.

Agents
- Earn commission on services provided to each MoMo Account User, including registration and cash-in/out transactions
- Minimize theft and fraud through cashless transactions.
- Increase foot traffic by attracting MoMo users.
- Avoid costly merchant card fees.

4. The only support required directly from the FED would be to allow the creation of Transactional Deposit Institution (DI).

5. These topics have been discussed in the submitted documents in at least the following areas:
   a. Central Authorities: the legal framework and therefore the authorities under which MoMo expects to operate the service are referred to in L.1. Legal Framework.
   b. Data management, DRP and BCP are covered in the documents in sections on architecture, resilience, system testing, security and SLA’s. Using cloud based solution to bring a nationally scalable solution, that will itself use multiple cloud providers over time, will allow MoMo to deliver the level of service necessary to meet customer expectations. These include Original Proposal: Resilience: E.6 Resilience, S.8 Data Protection, S.10 Authentication and in the addendum: 5.1 Stress testing, 5.18 Cloud SLA, 5.12 PII Data Encryption
   c. Technical and business process are in place to address fraud and protect customers, See S.1 Risk Management, S.6 Fraud information sharing and in the addendum: 5.3 Dispute Resolution, 5.17.4 Fast Learning.

6. Explanations of extensions of authentication capabilities to exploit biometric and future technical advances are given in Part B.2. Section G2P, B2P Use Case analysis, Part C. U.2.1 of the original submission; and in the addendum, see the MoMo Registration and authentication process description.

7. While the solution is naturally focused on the end-user, the benefits to B2B in logistics, reduction of cash handling and reduced exposure to defaults have proven powerful engines in allowing SMEs to interact with larger organizations.
Responses to comments in individual sections

Section U.1: “Payments are routed based on MSISDN (U.1.2).”

This is not the case. Our response states that payments can be routed based on any unique identifier (e.g. SSN,) and gives a list of currently supported and planned identifiers, as per the assessment in U.2.

Section U.1: “MMC will have to open accounts with the Fed: the ability to open these accounts is a significant assumption in the proposal.”

The best complete solution is to open accounts with the FED, the MoMo Entity has a fully developed fallback plan which will enable it to deliver its solution if (or until) it is able to open accounts with the Fed.

Section U.2: “the availability of Fedwire and other supporting networks may impact such interactions, and associated risks will need to be managed”

The MoMo Entity system will use FedWire until the proposed Faster Payments system is available. The FedWire proposal is an interim solution, only affecting transactions with legacy accounts. This allows a reduced dependency between the MoMo solution going live and the wider Faster Payments initiatives.

Section U.6: “Users must be connected to the cell phone network or internet in order to confirm payments.”

Although it is true that this is the case at present, MoMo Entity has a roadmap for future development which will include support for off-network transactions, this includes Near Field Communications (NFC) between participant devices. The main obstacle to implementing this at present is the availability of this service on mobile devices. Since MoMo is committed to inclusiveness, we normally wait for technical functionality to become widely available on affordable devices before extending the functionality of the application in ways that require customers to have it.

Section U.5: “It is not clear in the proposal if this would require foreign banks to open accounts with MoMo, to perform the FX and to act as a local settlement agent. It is not clear how settlement in multiple currencies will be supported by MoMo’s settlement account at the Fed. Additional details regarding the introduction of cross border capabilities will support a more robust evaluation”

There are different scenarios for the MoMo Entity:

1. In the countries where we are operating as a MoMo Entity we will act as a local settlement agent with accounts at the Central Bank (e.g. Colombia)
2. Alternatively, MoMo’s Entity cross border solution will require partners to open accounts within the MoMo system. This requirement is necessary to support full balancing of financial transactions within the MoMo system. The MoMo system will support accounts in multiple currencies, though it will insist that all subscribers have at least one account in the system’s base currency (in this case, US$). All transactions which move money into or out of MoMo accounts which are denominated in a non-base currency will have an effective exchange rate associated with them, and this will allow all account movements to be expressible in the base currency of the system. However, we will only support transactions through the Fed accounts which are denominated in the base currency of the system (US$).
3. If secure and effective facilities are available to support direct transfer to partners’ conventional bank accounts, then this requirement may be waived and cross-border funds
transferred directly to the partner’s bank account. In these cases, MoMo will expect to
transfer the funds via an ISO 20022 conversation between the two parties, which will not
require the participation of the Fed or the use of Fed accounts.

As our original proposal stated, MoMo does not propose to take a position on foreign exchange
transactions. Since it would be impossible for us to maintain accounts at the Fed in multiple
currencies without taking such a position (since it could not be guaranteed that FX funds deposited
into the account at a particular rate could be transferred out of the account at the same rate,) we do not
plan to maintain accounts at the Fed in any denomination other than US$.

Section E.1: “The solution’s success relies heavily on its capability to support MoMo account
funding from any bank account (through Fedwire or an alternative real time, good funds network.).”

The system is already operating successfully using a much less effective method of interfacing to
existing bank accounts than that proposed for this solution. In addition, the most successful mobile
money systems currently implemented worldwide use less efficient bank account transfer mechanisms
than that proposed for this solution. The solution we propose is targeted on the unbanked and
underbanked, and therefore expects bank transfers to be relatively infrequent in the overall operation
of the system.

Overall, we feel that the discrepancy between the MoMo assessment of compliance in this section and
the reviewer’s assessment is a consequence of a difference of perspective. The MoMo solution, as
described in our proposal, maintains the relationship with its customers. While we encourage the
participation of third parties who will offer value-added services, and who will compete with each
other and with us in doing so, MoMo will continue to own the relationship with its customers. Our
assessment is that we will be very effective in supporting competition in that context – certainly much
more so than are any other companies that we know of who are operating in this space.

If, however, we look at the position from the perspective of the provider of an open published service,
things are different. By an “open, published service” we understand a service which anyone can use,
provided they meet clear and defined criteria, to compete to provide services to any customers
whatsoever. An obvious example of a service of this kind might be a Faster Payments system. From
this perspective, the MoMo solution is less effective, since it only offers competitors access to a
defined pool of customers: that is, current and future MoMo customers; and does not provide
opportunities for competitor services to reach out directly to people or organizations who are not
already customers of the MoMo system.

We therefore answered the question from the perspective of our offering, and we still believe that this
is the correct way to assess our proposal; however, we appreciate that from other perspectives it might
be possible to come to a different, and less successful, conclusion.

Section E.3: “The solution’s success depends on building out the agent network; opening and
maintaining multiple accounts at the Fed; and securing FI support for funding MoMo accounts from
existing corporate bank accounts, ideally via real time networks. If barriers are presented to any of
these assumptions, the implementation as described could be extremely challenged.”

The MoMo proposal recognizes the risks associated with these points, and has fallback positions for
each of them.

With regard to the agent network, the proposed strategy of working with large distributors has already
been tested and in operation successfully in El Salvador,( M-Pesa in Kenya ) and the fallback position
of allowing end-users to identify agents who can then sign up on line provides a backup position.

With regard to maintaining accounts at the Fed, MoMo has an alternative strategy that will allow it to
operate without maintaining its own Fed accounts, as mentioned in our response to Section U.1.
With regard to the transfer of funds between MoMo accounts and traditional bank accounts, MoMo has a fallback plan, which is referred to in our response to Section E.1 of the assessment.

Section S.1 “In the event that an agent opens an account that proves to be fraudulent, there is no penalty if the agent followed procedures. These procedures are not outlined in detail in the proposal. If procedures were not followed, the situation is dealt with in consultation with the legal and regulatory authorities. Additional details on the monitoring and management of Agents would be helpful.”

The MoMo system is designed to be used, not only by end users who may be unused to banking procedures, but also by agents who may not be used to normal business practices as found, for instance, in the USA. It therefore leaves as little as possible to the initiative or experience of the agent, and relies on a process which requires the agent to meet the legal requirements associated with opening a valid account. This includes training to ensure that agents are aware of the nature and purpose of KYC processes, and to ensure that they understand how these processes are reflected in the registration processes for clients; but its core is the automated process which is defined by MoMo and which the agent must follow to register a client.

MoMo therefore regards a fraudulent registration as a failure in its internal processes. It looks first of all to improving those processes to prevent a recurrence of the situation, and to offering additional support to the agent concerned, rather than to punishment of the agent. Only where multiple problems occur with the same agent does MoMo consider rescinding the agent’s registration with the system.

Section S.6: “MoMo does not currently aggregate and analyze transaction data in real time to identify fraudulent transactions, but would consider using a third party to do so.”

Sanction screening including blocking of prohibited classes of transactions for people on AML lists, cross match analysis, replay protection and velocity analyses are currently implemented within the platform. Enhanced data analytics are expected to be in-place before the solution will be live in the US market.

Section S.7: “It is not clear from the proposal whether the solution provides a minimum requirement for device security. Handset data is encrypted using capabilities available on the handset, but it is not clear whether there are minimum requirements for this.”

The application that runs on handsets is built by MoMo, and is available in several flavors specific to phone operating systems (e.g. IOS, Android, or Microsoft) as well as a generic JAVA-based version provided by the target operating system; in the case of the generic JAVA application JAVA security libraries are used. This ensures that decisions about the adequacy of security levels can be made by MoMo’s architects at an operating system level, and do not rely on third parties. Where adequate security cannot be provided, MoMo will not support a version of the application for that device.

“A given MSISDN can only be registered to one user. An applicant is not required to prove that they are the registered owner of the handset.”

It is true that ownership for the handset is not required, but that is because it is used as a 2nd channel for notification purposes and the process ensures that they have access to the device using the MSISDN.
**Section S.10:** “The proposal does not clarify whether the process is the same for an Internet-based end user.”

Users accessing the solution via the internet have the same requirement to validate a 2\textsuperscript{nd} channel for security purposes.

**Section L.2.**

From MoMo’s experience in El Salvador and from our understanding of the legal requirements, as discussed in L.1. MoMo is confident that the payment system rules and associated structures to protect consumers will be in place. The QIAT’s interpretation is correct: MoMo expects to retain legal liability and responsibility for the operation and delivery of the solution.

**Sections G.1. & G.2**

MoMo will establish the governance structures required to operate the solution in accordance with the applicable laws, regulations and common practice. The board and its committees continue to engage legal counsel to ensure compliance as discussed in the proposal.
MOBILE MONEY (MOMO) PROPOSAL

TASK FORCE ASSESSMENT COMMENTS

Please share your concerns about this proposal’s assessment against the Effectiveness Criteria.

Effectiveness criteria were evaluated within limited scenarios—i.e., the unbanked and underbanked, and the solution requires special support from the Federal Reserve. The assessment is accurate within this limited scenario. But rating the criteria as "effective" in an expanded use case scenario—beyond the unbanked and underbanked—is questionable.

Certain areas of the assessment are very generous given that this solution is largely speaking a cash-based system that is highly dependent on a large network of agents and the Federal Reserve as the funds vault. It is essentially a pre-paid type service. While the technical solution may be sound, scalable, etc., I fail to see how the larger payment solution would be scalable, able to be implemented in a reasonable timeframe, comprehensive and useable. As such, I believe that many of the criteria in these areas are being rated higher than should be the case when looking at the solution in a larger context of a payment solution vs. a technical solution.

While innovative, well documented, and comprehensive, the MoMo is a form-factor driven and single market (unbanked) focused solution that, at best, MAY one day co-exist and perhaps interoperate in a faster payments environment. It is not an end-to-end fully inclusive solution that could be adopted by the bulk of American banks, businesses, and consumers. This solution should have been disqualified or at least assessed on the same basis as (some of) the other proposals. However, the QIAT ratings for the MoMo proposal are reasonable if we discount the fact that the solution would be applicable to less than 50 million U.S. consumers.

Rated high for Ubiquity but we disagree in that the solution’s primary target is unbanked, leaving the majority of our industry unsupported.

Innovative proposal—appears to be singularly focused on unbanked. Does not address the rest of the payments ecosystem/market—so QIAT overrated.

Solution proposed to run in AZURE open cloud environment. Concern about security of customer data and how that is properly protected from the hackers. Just having it in the cloud on secure infrastructure does not mean the application and data are also secured.

MoMo’s proposal does not meet the criteria to move the greater US financial marketplace to an end-to-end faster payments system. In the future, it might be part of a solution, but misses the mark for inclusiveness and requires heavily on the Fed for success.

There is also concern about the ability to sign-up 450K agents/networks and the ability to launch a viable MoMo solution in a foreseeable timeframe. MoMo is a cash-based model targeting financial services to the unbanked and underbanked, through inclusion of their offering high quality and at lower cost than the U.S. market, but is not tailored for the overall Faster Payments needs.
Consumer-based money transfer system with single pooled account and network of cash in/out agents.
No new technology. Appears very limited – similar to Mpesa.

Points of disagreement with the QIAT assessment:

- The QIAT is too optimistic about the solution. It has significant shortcomings. In many instances, the QIAT describes the solution as effective, but in some criteria, the solution is at best only somewhat effective or not effective at all. At other times, the solution is more effective.
- U.1. Instead of “effective,” it should be “very effective.” The system works in El Salvador, where very few entities have bank accounts.
- U.2: Not effective: it is unrealistic to use agents. Agents are not going to be open 24-7 and will probably not do well at authentication.
- U.3. Predictability. “Somewhat effective,” not “Very Effective.” The proposer suggests that it would comport with existing laws and that the CFPB would act as the regulator of the system. However, given that many of the participants will be licensed as money transmitters (or not at all), there will be questions of jurisdiction. The CFPB may not have defined “large-participant” status in some of the agent business sectors.
- U.4. Contextual data capability. “Somewhat effective,” not “effective.” The system relies on agents. Transactions only have full messaging capability when both transactors have MoMoney accounts.
- E.3: Implementation Timeline “not effective,” not “effective.” Realistically, it is hard to imagine that Mobile Money can build a network of 450,000 agents in the near-term future. Additionally, the solution does not address the distribution of those agents. It seems likely that agents would congregate in urban areas. How well would the system work in places like Wyoming, Alaska, or the Dakotas?
- E.6. Scalability: “Somewhat effective,” not “very effective.” While the system’s use of technology may allow clearing and settlement to occur regardless of the size of the system, the lack of an agent network undermines the ability for some entities to access the system. Thus there could be scale opportunities for back-end processing but not for user participation.
- S.1 Risk Management: “Not effective,” not “effective.” By not punishing agents for cases where fraudulent actors enter the system, Mobile Money creates a barrier to enforcement. Even the system of tax preparation, where minimal regulations do hold preparers accountable for fraudulent filing, does not work. Experience shows that many preparers facilitate widespread fraud as a means of achieving pricing power. The fact that the approach requires authentication before each payment is laudable, but there are still shortcomings to this enforcement regime.
- S.10. End-user authentication. Instead of “effective,” only “somewhat effective.” Because it allows non-participants to receive payments to one-time unregistered accounts, the system allows for recipients to defraud consumers into sending push payments.

Mobile Money is a fairly thin solution. While it does offer widespread access, it lacks for some consumer protections. It could use a better system for fraud protection and risk management. It is also the case
that its messaging capacity could be more robust. There is no penalty to an agent that opens an account that proves to be fraudulent.

The proposal is not in conformance with the requirements of a full solution proposal. The requirements were designed to ensure that McKinsey and Task Force time and resources are focused on end-to-end solution proposals that can be thoroughly and credibly assessed against the criteria. This proposal does not meet the requirements. Proposal has answered all sections of the template but in many cases the response does not provide information that would allow the QIAT to evaluate the proposal. The Proposal Template included instructions for Part C: Self-Assessment against Effectiveness Criteria that asked proposers to include a "detailed discussion of why the rating is justified and how the solution meets each criterion" (page 22 of template). It does not include specific information in Part C as to how or why the proposed solution meets each of the criteria. As a result, the QIAT is unable to evaluate the solution with the information provided. Altering the existing process defined to offer an opportunity for the proposer to include more explicit information in its submission to make the proposal "assessable" would be unfair to proposers who provided complete proposals before the submission deadline. A few of the reasons why the proposal did not meet the requirements are as follows: The solution does not address B2B cross-border transactions. The solution does not aggregate or analyze transaction data. The solution contains no minimum required participation agreements. Applicants are not required to prove they are the registered owner. The solution is push payments only.

Please submit any comments about this proposal’s assessment against the Effectiveness Criteria.

I would have liked the QIAT to delve more deeply into some of the concerns around scalability (in both the agent network and the capacity to process for more than 100 million consumers) and implementation. These are touched on briefly in the summary, but could be explored in more detail.

The solution offered no overall governance model proposed within the solution to be “somewhat effective.”

Generally agree, and appreciate the detail re: dispute resolution procedures. Would like more detail on terms and conditions that will cover these accounts, and whether consumers will be fully protected in case of all types of fraud (including victim-assisted fraud).

Solution’s primary focus is on unbanked and underbanked, which are important audiences, but achieving ubiquity with this model would be challenging.

(1) Interfaces with existing payments system (2) Supports multiple languages (3) Addresses large unbanked and underbanked segment (4) Can support bank users (5) Account balances updated in real-time – contributing to better money management with this target segment (6) PII doesn’t travel as part of payment.

Accessibility rated too highly as it is not clear how they enable payers to reach any and all individuals throughout the US with their MoMo account, and adoption plan to support such. Settlement for
accounts within the system are fast, but seems too highly rated given there is lack of a plan to connect all accounts throughout the US and will require funds to move in and out of the MoMo system. Rules is rated too highly, as proposal states topics to be covered in rules, but lacks details, and references user Ts & Cs. Governance rating too high, as states key aspects of governance not defined.

I struggled with this proposal's assessment. Reading the proposal at face value, I think the ratings are somewhat reasonable. The proposal focuses on the unbanked/underbanked and does not address those with banked accounts, though the QIAT gave them credit for being able to work effectively within a banked environment. The proposal relies on the company's ability to get a FED master account and roll out the system to 450k agents, both of which could happen but will be difficult to implement.

**TASK FORCE SOLUTION-ENRICHING COMMENTS**

**Ubiquity**

Thank you for the comprehensive submission. I was particularly interested in your ability to provide service to the underbanked and unbanked in our existing banking system.

Would have like to see how this system could be implemented within the banked environment. For example, working with solution providers to serve small and medium FIs.

The solution could be enriched to describe how the system could be utilized more fully by established account holders who may or may not receive funds from a disbursement organization. In addition, a more descriptive role of an "agent" and what defines an agent would be beneficial. The solution could also be enriched to support B2B cross-border payments.

The use of the smartphone and internet is a good approach. There are however unique questions associated with this proposal. The necessity of a large group of agents, 450,000, is going to be a difficult hurdle. It is proposed that these are small businesses where participants can sign up. What is missing is the value proposition for agents. Is there a signup fee or a money loading fee to the system for participants? If so, how much and is the cost worth using the system?

Another piece of ubiquity is the fact that participants must request a code voucher from the system to redeem their money. Any added level of difficulty is going to inhibit adoption.

Overall what was mostly lacking from this proposal was a detailed explanation of the value proposition for everyone involved. Faster is nice but at what cost? What fees are participants going to see and what fees are agents able to collect? Are there ceilings to what fees can be assessed? While it was stated that transactions might be less expensive, is that still the case after including all upfront or withdrawal costs?

The proposal seems to have a misunderstanding of the central banking system of the US. It would be useful to create a network of banks at The Fed instead of seeking to create a central-control system as a
central account of record at The Fed. This confusion occurs because of the unique nature of the US central banking system. It could easily be converted to a private-sector bank network or payments services provider network which can perform the clearing through a central account system that is not held at the Fed.

Perhaps I am incorrect in my thinking (highly possible) but I thought that the original aim of the FPTF process was to garner from the marketplace proposals for end-to-end faster payments schemes that could move the entire nation's payment systems ahead in terms of speed and settlement finality. The MoMo solution and several others (the SaaS proposers, for instance) appear to have missed the mark (if that was, in fact, the target).

Relies on a network of registered agents/merchants & end-users.

Relies on role of Federal Reserve and accounts set up by proposer at FED.

Does not seem to focus on all market and users.

Getting FIs to support could be challenging, but could also work if they all agreed this is the route to take with unbanked and underbanked segment.

**Efficiency**

It appears the solution is overly reliant upon the FED, the proposal could be enhanced if there are mechanisms that the solution could be rolled out without extensive assistance from the FED.

The solution could be enriched to allow for multiple end-user routing mechanisms besides MSISDN (phone number). Also, the solution could be enriched by describing the solution's interoperable capabilities with other faster payment systems.

The requirement of registering so many agents will increase the cost and lower the efficiency of the system. The estimated cost of just under 2% of transactions is already higher than the average cost of a payment.

Describe how businesses can pass information with their payment in a way that both parties (and any intermediaries) know what data is being passed in what format—esp. describe how receivers will know what data will be arriving with their payment and how to deal with that within their systems.

Users have to have smartphone or internet access to set up and make payments.

Takes time to set up 450k agents/network.

**Safety and Security**

The reference to hosting the solution in Azure solves and provides a secure infrastructure perception. Would like to see additional emphasis on how MoMo plans to protect the application and
customer/account/payment data from a safety and security perspective. Need to demonstrate how you plan to execute this in a public cloud environment against the growing number of attacking hackers.

Describe who (which entity) manages the call center and who retains the data about each user (name, password, DOB, etc.). What defines the entities that would be put on a watch list? What “interested parties” would this data be shared with? (p. 128)

Security protocols appear to be robust, and use of PIN security, in addition to the device's native security features, is appreciated.

**Speed (Fast)**

(none)

**Legal**

I would have liked to see some suggested implementations for a legal framework, particularly in light of the need to ensure that all financial institutions have equal access to a faster payments system.

The solution could be enriched by describing the various system rules within the MoMo network and what Rules are in place to serve the unbanked and under-banked communities.

Describe more fully what is in the referenced user Ts & Cs and how those align with criteria that should be supported by rules. (Describe rules pertaining to various parties vs. rules that drive the system capability.)

**Governance**

I would have liked to see some suggested implementations for a governance framework, particularly in light of the need to ensure that all financial institutions have equal access to a faster payments system.

The proposer describes the creation of a new entity/committee to oversee the governance of the solution. However, the solution could be enriched by describing the overall responsibilities of the new governance model.

Governance left much to be desired from an end-user perspective.

Ownership will remain with MOMO and a Board of Directors and Committee will be established but it is not explained who will participate. Will it be inclusive or not?

Lip service was paid to inclusive governance as it applies to G.2. One or more user representatives will be included. That statement is absolutely meaningless at it applies to being inclusive. One out of how many and on what governance levels? Will the Board, Committee, and any subcommittees each have
one user representative? What is the percentage of overall user representation to the total for each level?

Describe the process of governance, and what parties specifically will be involved, in what capacity, other than corporate governance.

G.1 Effective governance & G.2 Inclusive governance – Not Effective, no governance was mentioned and only they mentioned "Bodies providing oversight in the regulatory framework” but no real framework for governance.

I appreciate that the governance practice includes "one or more User representative," but I fear that this falls short of the ideal expressed in the criteria related to proportional representation of different stakeholders. There are numerous relevant stakeholder groups, and I'm concerned that a single representative would not be equipped to express these divergent views and would certainly lack the influence necessary to shape policy on the Committee.

Time to set up governance model and stakeholders impacts overall adoption and timeline...
This document is a brief response to some of the comments received from reviewers of the Mobile Money proposal in response to the Fed’s Faster Payments Initiative. It is organised by topic rather than being focused on individual comments.

1. The MoMo solution as described is capable of addressing all of the use cases outlined in the proposal effectively. Some commentators have remarked that our value proposition is directed at and suitable only for the segment of the overall market that is unbanked and underbanked individuals and this is not correct. We view the ability of MoMo to service the entire universe of use cases to be a strong point, and the ability to specifically service the unbanked, underbanked and the unhappy banked.¹

2. A number of organisations commented that our proposal only addressed a part of the overall requirement. They are wrong. This is because we preferred, in contrast with some other proposals, to concentrate on functionality which is already contained or in development in our commercially available product;
   o The simplified Depository Institution, which would have a joint account (custodial) in the Federal Reserve Bank, to hold 100% of the reserves for all its prepaid transactional account holder’s deposits. This entity would not make loans or Investments, and would not require FDIC insurance.

3. However, the use of a pre-funded system in a Joint account at the Federal Reserve Bank will settle transactions immediately and could be extended to cover all inter-bank transactions;
   o An eligible Institution which would have a “Settlement” joint account (custodial) in the Federal Reserve Bank to hold 100% of the Depository Institution reserves for all its prefunded interbank transactions.

4. Several comments expressed scepticism about the viability of our dealer network business model. We feel that these comments did not properly consider our proposed use of commercial distributors to manage the network of agents. Distribution organisations already have commercial relationships with the small retail outlets we intend to enrol as agents, and working with them will enable us to reach out effectively to large numbers of these businesses in a short time. This is a tested business model in the mobile money world which has worked well in many other implementations.²

5. A small number of comments questioned how we would manage the structure and content of interfaces with other providers. We think that this was covered in some detail in the proposal, but would like to re-emphasise: our interface definition process allows any type

of information, contextual data, to be passed across the interface by third parties. We allow the third party to define the structure and content of the interface themselves, and to map their content onto our transactional structure.

6. Some responders expressed concerns about security. Our security measures meet or exceed industry best practice in all areas. In particular, our databases are fully encrypted and no information is passed to third parties except via secure channels and for approved purposes. We also conduct external security reviews of our system to ensure that we continue to keep our customers’ money safe.

It is also important to note that no sensitive data is stored locally in a handset or computer.

7. We would like to emphasise that we take compliance regulations extremely seriously. Although the details of an AML or KYC implementation are specific to each national jurisdiction, and concrete initiatives did not therefore form part of our proposal, it is perhaps worth saying that our implementation in El Salvador already supports AML checks based on the US OFAC list and the UN ONU list of prohibited entities.

Randolph Kantorowicz-Toro.
CEO
Faster Payments QIAT

FINAL ASSESSMENT

Proposer: Mobile Money Corp.

Summary Description of Solution:

The Mobile Money Corp. (MMC or “MoMo”) solution is a cash-based, closed-loop solution that is targeted at the “unbanked” and “underbanked.” End-users can fund MoMo accounts in the following ways:

- Receiving payments from disbursement organizations such as federal assistance programs through the MoMo system. (Funds move from the organization’s legacy bank account to the corporation’s MoMo account, and then payments are transferred from the corporation’s MoMo account to individual recipients’ MoMo accounts.)
- Salary payments through the MoMo system
- Transfers received from other MoMo account-holders
- Remittances received from MoMo account-holders located abroad
- Depositing cash through an agent network

MoMo account-holders can use the funds in their MoMo account to:

- Pay bills (domestic bills such as utility bills)
- Send money to other MoMo account-holders
- Withdraw cash from an agent location
- Buy goods at agents where MoMo payments are accepted

Consumer payments are routed using MSISDN (Mobile Station International Subscriber Directory Number, a number used to identify a mobile phone number internationally), and business and government payments are routed using a business ID. The system approves transactions only if funds are available within the MoMo system.

The solution assumes that MoMo will have a Master Account with the Federal Reserve that shows the activities among MoMo accounts in the system, as well as an account that handles all settlement activity within the solution. The solution thus relies on double-entry accounting. Approval, clearing, and settlement between MoMo accounts occur in less than one second, and payers and payees receive payment notifications. The solution relies heavily on the GSMA (Groupe Spéciale Mobile Association) Risk Management Tool Kit and the capabilities provided by Microsoft Azure solutions.

The solution also relies on a network of agents that register end-users and provide cash-in and cash-out capabilities. The proposal anticipates end-user growth through individual and bulk registrations, which will be driven by business and government entities that seek alternatives to check payments, as well as use of MoMo by distributors to support their customers’ payments. The proposal provides a detailed implementation plan that also considers cross-border payments. The solution has been deployed in El Salvador, and discussions are underway to deploy in Colombia.

EXECUTIVE SUMMARY OF THE PROPOSAL

- Major strengths
  - The solution is targeted at serving the unbanked and underbanked. A credit history is not required to open an account, and electronic “good funds” are almost instantly available in the account.
The solution is a clearly defined, closed-loop system. It employs a simple settlement mechanism that relies on settlement accounts held at the Federal Reserve.

The proposal provides thoughtful responses regarding technology set-up and legal arrangements.

The proposal focuses not only on ensuring financial inclusion for un(der)banked individuals and small businesses in the U.S., but also on supporting big, paying organizations in reaching these un(der)banked persons. It also promises improved logistics, reduction of cash handling, and reduced exposure to defaults for participating entities.

Drawing on lessons from existing implementations elsewhere, the proposal clearly describes considerations for implementing the solution in the U.S. with various participant groups. The proposal discusses expansion to additional markets (international capability) and transaction types (e.g., remittances).

**Areas for improvement and enhancement**

- The solution leverages existing infrastructure to move funds between a legacy account and a MoMo account. The solution does not describe how it will leverage enhancements to existing infrastructure to deliver Faster Payments.

- The solution relies on agents (450,000 planned in the U.S. within five years) to support all transaction types and to manage the opening of accounts for end-users. It is not clear how the solution can scale to support a network of this size, nor how it can guarantee low pricing when leveraging cashing agents.

- The solution would require substantial support from the Fed to create a “Transactional Deposit Institution” in order to support launch and settlement.

- It would be helpful if the proposal provided more explicit details regarding central authority, data management, processes for DRP (disaster recovery planning) and BCP (business continuity planning), and fraud management.

- The current authentication process relies on a PIN. Although the proposal indicates that iris scanning and certificate public keys are proposed authentication methods, it does not describe a process for adding new authentication capabilities.

- It is not clear from the proposal whether the solution can deliver its full value proposition for all major use cases (e.g., B2B).

**Use cases addressed**


**Proposer’s overall ability to deliver proposed solution**

- The solution is well designed, and the proposer has been diligent in addressing the criteria. The solution has been implemented in El Salvador, which demonstrates that the design is viable in practice.

- The solution has been described in detail. There are a few concerns related to dependencies and assumptions described in the proposal. The first dependency is that the Federal Reserve Bank will authorize MMC to open and maintain Federal Reserve accounts. These accounts will be instrumental to supporting settlement as designed. Alternatively, MoMo may become a chartered DI (depository institution). It will be the Federal Reserve’s decision whether to support this option. In a third option, the MoMo entity would be established by new federal
legislation to enable the MoMo system. Without accounts at the Federal Reserve, the potential risks may make the solution unviable.

– The solution’s success also relies on building out a large agent network (450,000 locations in five years). This network will be required to support unbanked or underbanked end-users. There are concerns about the capability of these agents to authorize end-users when they enroll and as they deposit and withdraw funds to and from the MoMo system. Training this large network, as well as monitoring and managing their performance, may be challenging.
ASSESSMENT

Ubiquity

U.1 Accessibility

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

Rationale:

MoMo’s mission is to extend financial inclusion to the unbanked and underbanked. The solution can serve business and individual end-users, both banked and unbanked. It is cash-based; users can fund their MoMo account with a cash deposit, a payment from a MoMo subscriber, payroll, a benefit or remittance payment, or transferred funds from an existing bank account (Fedwire, real-time networks when available) (U.1.1). Funds can be withdrawn through MoMo’s agent network or participating ATM networks, or by transferring funds to an existing bank account. Money can be transferred from one MoMo account to another quickly and reliably.

The solution supports multi-currency payments but does not describe how cross-border settlement will occur through the MoMo account held at the Federal Reserve. The initiator must approve each transaction for it to proceed. The proposal anticipates growth via new user registration, either as individuals or en masse through a business or government agency (U.1.4). Account registration includes the KYC requirements for the jurisdiction where the solution is implemented.

End-users must have a smart phone, a feature phone, or Internet access to participate in MoMo (U.1.2). Payments are routed based on MSISDN (Mobile Station International Subscriber Directory Number, a number used to identify a mobile phone number internationally) or a “unique identification” (p. 106) associated with the payee on the payer side (U.1.2). To enable the movement of money to/from existing bank accounts, MMC will have to open accounts with the Fed; the ability to open these accounts is a significant assumption in the proposal. The proposal indicates that there is an interim/fallback plan in the event that it is not able to open accounts with the Fed.

MoMo offers APIs to support the addition of new services or providers. The proposal states that MoMo payments are more affordable than traditional payment mechanisms, but details of the economics are not provided.

U.2 Usability

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

Rationale:

End-users can cash out payments at a network of agents (smaller retailers). To do so, they must request a bar code voucher from the system and present that voucher to the agent for approval. Once the voucher is approved, the agent can dispense cash to the end-user (U.2.1).

The solution is a closed-loop system and is available 24x7x365 (U.2.3). The mobile app (“B4P”) and internet app allow subscribers to see their current balance. The registration process requires at least one unique identifier, which can be a tax identification number, a passport or visa, a cell number (MSISDN), or an email address. It is the assessors’ understanding that payments can be routed using any one of these unique identifier aliases.
The solution is available in multiple languages, and a call center with agents is provided to support end-users (U.2.4). The solution works with the iOS and Android operating systems, feature phones using Java, and the Internet.

Users must be connected to a cell phone network or the internet to confirm payments. The proposal indicates that support for off-line transactions is on the product roadmap and will be deployed when this capability is broadly available on affordable devices.

Interactions with existing account infrastructure to fund MoMo accounts are managed through Fedwire; thus, the availability of Fedwire and other supporting networks may impact such interactions, and associated risks will need to be managed. The MoMo Entity system will use Fedwire until the proposed Faster Payments system is available, allowing MoMo to launch independently of further Faster Payments development.

U.3 Predictability

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale:**

The solution is effectively a closed-loop solution and can operate independently. It provides an app to end-users to deliver a consistent experience across mobile devices. Functionality is consistent across mobile and internet channels with the exception of authentication options; some options—such as biometric authentication—are available only on the mobile device. The solution’s payment system rules are based on the laws relating to financial systems in the country where the solution is deployed. These rules should be fully supported by government. MoMo adopts the rules once government and central bank regulators have reviewed and approved them.

In the U.S., MoMo will work closely with the CFPB (Consumer Financial Protection Bureau) to ensure that dispute processes are fair and complete. The proposal states that the dispute process will follow local regulations, including Regulation E. The process includes disputes arising from transfers between MoMo and depository institutions and FIs. Terms and conditions for the MoMo system will be available to all account-holders, and notification will be provided for any changes. The dispute process is described at a high level in the proposal, with SLAs (service-level agreements) provided for the resolution of all complaints.

U.4 Contextual data capability

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale**

The proposal states that for transactions between MoMo accounts, minimal contextual data is required because the relationship between the account-holders and the nature of the transaction are well understood (U.4.1). This assumption may not be valid, especially as B2B payment use cases are added and as the number of end-users and transactions increases (U.4.2).

For transactions involving non-MoMo accounts, the solution will supply contextual data based on the requirements of the transfer mechanism used. The MoMo system can accommodate interactions with third parties that require the inclusion of party-specific information with the transaction (e.g., invoice number), as the solution can be configured to support all types of
information. The proposal indicates that the solution will map all data types onto ISO 20022 data structures for communication with external providers, including government entities, FIs, PSPs (payment service providers), and third-party service providers. Until these providers are ISO 20022-ready, the solution will use existing interfaces.

U.5 Cross-border functionality

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale:**
The proposal enables cross-border capabilities through MoMo-to-MoMo account transfers and through partnerships with mobile money operators in other markets (U.5.1). The solution identifies recipients of cross-border payments by MSISDN. It provides the payment initiator with all details on transaction and FX fees for approval prior to the transaction (U.5.3). The FX provider guarantees transfer of funds to the payee system, which then transfers funds to the recipient’s account. All transactions that move money in or out of a MoMo account denominated in a non-USD currency will have an associated effective exchange rate that will allow account movements to be expressed in USD.

The initial solution will require participating foreign banks to open accounts with MoMo. Transactions within MoMo will then occur in USD, with the FX provider performing the exchange and acting as a local settlement agent. MoMo’s accounts at the Fed will only support transactions in USD. If secure, effective facilities are available to support direct transfer to partners’ conventional bank accounts, cross-border funds may be transferred directly to those accounts. Additional details regarding secure and effective facilities will support a more robust evaluation.

Where MoMo interacts with a third party to support remittances to another country, and that third party does not have a recognized communications API to support the transaction, the ISO 20022 standard will be used to support these transfers. The use of ISO 20022 will preclude the need to create new interfaces and will allow the third party to re-use the interface to communicate with other organizations.

MoMo is currently operational in El Salvador, where the solution focuses on addressing the needs of the U.S. remittance market.

U.6 Applicability to multiple use cases

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale:**
The proposal states that it intends to address multiple use cases, but the solution is primarily focused on use cases involving the unbanked and underbanked. As a result, it may be challenging for the solution to generate volume with other use cases (e.g., B2B).
Efficiency

E.1 Enables competition

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale:**

The solution levies per-transaction pricing that is published and disclosed in advance (E.1.3). The UI (user interface) uses APIs; changes to end-user functionality are therefore easily distributed to support the addition of third-party services. Individuals, businesses, and governments can all participate in MoMo (E.1.4).

The MoMo solution targets the unbanked and underbanked and enables cash as well as non-cash payments. MoMo is the only provider of the solution, and end-users must enroll directly with MoMo (E.1.2). MoMo accounts may be funded from any bank account through Fedwire or an alternative real-time, good-funds network.

MoMo is a closed financial system with an open, flexible model that supports the set-up of third parties such as utility companies, which are a critical component of MoMo’s financial inclusion strategy. MoMo aims to retain the customer interface but welcomes other providers to create solutions feeding into that interface.

E.2 Capability to enable value-added services

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale:**

The proposal states that third parties can access the network to compete with the services that MoMo provides (p.115) or to offer additional services, such as payday loans, that MoMo does not offer. Transactions in the MoMo system are always between MoMo accounts. Any organization that wants to provide services through the MoMo system must open and maintain one or more MoMo accounts within the system.

Because all transactions within MoMo are prefunded, risk is low. It is the assessors’ interpretation that FIs and other PSPs could leverage this solution to introduce payment capabilities for new products and services (E.2.1). MoMo will review all services prior to inclusion to ensure that they comply with required legislation. Once approved, services will be added to the MoMo menu system.

MoMo requires that a service must clearly state the costs associated with using the service. These costs must be described at enrollment; APIs can support quotations for service. The charges for a given transaction will always be clearly visible to the MoMo end-user, who can then choose to confirm or cancel the transaction.

E.3 Implementation timeline

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

Rationale:
The solution’s implementation plan is comprehensive and based on MoMo’s implementation in El Salvador, its developments in Colombia, and the experience of MoMo’s senior team. The main drivers for adoption will be the immediate availability of funds and reduced costs, as transaction costs are expected to be less than 2% of the transaction’s value.

The solution’s success depends on building out the agent network, opening and maintaining multiple accounts at the Fed, and securing FI support for funding MoMo accounts from existing corporate bank accounts, ideally via real-time networks. If any of these assumptions are invalid, the implementation as described could be extremely difficult. The proposal indicates that MoMo has mitigation plans in place for these identified risks.

To create an agent network, MoMo plans to establish agents wherever and whenever needed to support end-users. MoMo will work with distributors who supply small businesses that can offer MoMo agencies as a product. Distributors will offer set-up and training, and agents will earn commission on the transactions they facilitate for MoMo users. MoMo will also leverage B2B distribution networks, particularly larger distributors who can reach hundreds of thousands of retail establishments. The distributors and the retail businesses will both become MoMo account-holders.

MoMo has been fully funded for the last six years, and its financial backers are committed to continued deployment over the next two years, with a focus on operations in the U.S. and three other countries. The proposal states that revenues will be generated through fees charged to end-users and to bulk payers such as governments (E.3.1).

E.4 Payment format standards

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

Rationale:
The solution uses its own proprietary message format. The proposal states that this format can be converted into other data formats, as the solution maintains an internal mapping capability to support standard data structures, including the structures used to interface with Fedwire and CHIPS (E.4.1). The solution will support ISO 20022 as it deploys more broadly.

E.5 Comprehensive

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

Rationale:
Because MoMo is a closed-loop solution, all aspects of the payment process are addressed within the solution (E.5.1). The solution is designed as a cash-based system. End-users can fund MoMo accounts by making cash deposits, receiving payments from other MoMo accounts (personal and commercial accounts), or receiving payments from existing deposit accounts using Fedwire.
E.6 Scalability and adaptability

**Very Effective**        Effective        Somewhat Effective       Not Effective

**Rationale:**

Wherever possible, the solution leverages virtual machines and uses storage on the cloud. This design supports quick configuration changes to address volume fluctuations. TPS (transactions per second) variance can be addressed within 30 minutes (p.120) (E.6.2). The solution scales horizontally by deploying the same code to multiple independent servers and balancing the load. This approach allows new code to be introduced while the system is running, and new servers to be added without impact.

E.7 Exceptions and investigations process

**Very Effective**        Effective        Somewhat Effective       Not Effective

**Rationale:**

MoMo will be transparent in its dispute management processes, as terms and conditions will be available to all account-holders through all channels. End-users with a complaint can contact the MoMo support center 24x7. All actions will be documented, and all complaints will be resolved within three days. If the complainant is dissatisfied with the outcome, the issue can be directed to the CFPB, and MoMo will work with the CFPB to resolve the issue. MoMo has a detailed, proven process in place in El Salvador that can be leveraged and modified as needed for use in the U.S. MoMo invites regular review of its processes by the CFPB.

The solution provides notification of failed transactions but not fraudulent transactions (E.7.1). The exceptions and investigations process is supported by the extraction of transactional data from the application’s main data store into a separate data store that is available for subsequent analysis.

Safety and Security

S.1 Risk management

**Very Effective**        **Effective**        Somewhat Effective       Not Effective

**Rationale:**

The MoMo solution is based on push payments and immediate settlement. This model addresses liquidity, credit and settlement risk. The proposal outlines a detailed “request reversal” process that can be deployed if a payment is made in error. The solution is highly configurable and supports parameters related to account management and transaction management.

In the event that new code is required to address an event, the proposal states that MoMo can deliver new code in weeks (S.1.3). From a settlement perspective, MoMo is a closed-loop, pre-funded solution, and the debit and credit value transfer to support a payment occur simultaneously within the system (S.1.2). If any part of a transaction fails, the entire transaction is canceled. The sum of balances in the system should always be zero; the balance of MoMo’s internal control account should be opposite the balance of MoMo’s master account held at the
Fed. A reconciliation process is run at regular intervals during the day to ensure alignment between the control account and the master account, with the master account being the authoritative source.

End-users must authenticate themselves at each session using a PIN (S.1.4). MoMo employs GSMA data security requirements to avoid any manipulation of data by a third party and has developed risk controls based on the GSMA Risk Management Toolkit. New employees and agents in the MoMo system must complete training on social engineering fraud risk, KYC, AML, and general fraud awareness (S.1.3). Market watch lists are monitored, updated according to the government’s Compliance Office schedules, and loaded onto the system within one week of receipt. Watch lists maintained by the UN and U.S. government (i.e., OFAC) are updated monthly.

MoMo provides agents with training on KYC processes and has developed an automated process that an agent must follow to register a client. The proposal does not describe the steps in this automated process. If an agent opens a fraudulent account, there is no penalty as long as the agent followed procedures. If procedures were not followed, the situation is addressed in consultation with the appropriate legal and regulatory authorities.

S.2 Payer authorization

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale:**
MoMo is a closed-loop system. End-users must authorize themselves to the solution to initiate a session but are not required to authorize each transaction within a session (S.2.1). Authorization includes validation of the device as well as validation of the individual using a PIN or biometric data if available on, and supported by, the mobile device. The solution allows end-users to set up payments in advance based on defined parameters (payee, amount, date, recurrence) (S.2.2). Subscribers are asked to confirm the transaction before it is made and can decide to cancel the transaction at that time (p. 130) (S.2.3).

S.3 Payment finality

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale:**
The solution is pre-funded and supports only good funds payments (S.3.1). Funds are transferred between the payer and the payee in the same instance, and funds are available to the payee and become irrevocable when the transaction is completed (S.3.2).

The proposal provides details regarding a dispute process and a “request reversal” process that are available to end-users if a payment has been made in error. Dispute processes are transparent, and all complaints will be resolved within three days.

S.4 Settlement approach

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>
Rationale:
MoMo is a pre-funded, cash-based solution. Settlement within the solution occurs in seconds, with recipients having immediate access to funds. MoMo intends to hold Master Accounts for cash liabilities in the Federal Reserve to eliminate any settlement risk within the solution (S.4.1). Subscribers can transfer funds in/out of a MoMo account from/to a depository institution using existing industry capabilities. Timing of settlement of transfer transactions will depend on the system used for the exchange of funds. MoMo manages potential exposure related to the transfer of funds out of the system by suspending the transactions until it receives confirmation of receipt of funds from the external system (S.4.2). Transactions between MoMo accounts and depository institutions will be settled in central bank money (S.4.3).

S.5 Handling disputed payments

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

Rationale:
MoMo’s processes for handling disputed payments will be highly transparent; terms and conditions will be available to all account-holders through all channels. End-users with a complaint can contact the MoMo support center 24x7. All actions will be documented, and all complaints will be resolved within three days. If the complainant is dissatisfied with the outcome, the issue can be directed to the CFPB. MoMo will continue to work with the CFPB to resolve the issue. MoMo invites regular review of its processes by the CFPB.

MoMo has a detailed and proven process in place in El Salvador that can be leveraged and modified as needed for use in the U.S. The solution can block funds, freeze accounts, and close accounts as necessary (S.5.1). The proposal states that the solution has policies and procedures that reflect local laws and regulations, including Regulation E, in protecting payers. (S.5.4). The proposer states that these procedures should reasonably protect business, government, and consumer payers (S.5.4).

S.6 Fraud information-sharing

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

Rationale:
The solution supports the capture and storage of all transaction-related information. The proposal states that a central repository capability may store and aggregate this information (S.6.6). The solution will provide appropriate information in each case of shared fraud information; PII will not be shared (S.6.1). The solution will meet Consumer Protection law requirements regarding data protection. MoMo does not currently aggregate and analyze transaction data in real time to identify fraudulent transactions but would consider using a third party to do so. The solution, however, ensures proper sanction screening, including the blocking of prohibited classes of transactions for people on AML lists, cross-match analysis, replay protection, and velocity analyses on the current platform. The proposal indicates that enhanced data analytics are expected to be in place before the solution goes live in the U.S. market.
S.7 Security controls

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale:**

The solution is hosted by Microsoft Azure and leverages Microsoft capabilities to provide audit and geographic redundancy. A checkpoint solution mitigates intrusion risk; layering architecture protects data from intruders, and public-facing machines and the MoMo database are not directly connected. Session data is encrypted using HTTPS, and commercial solutions require additional authentication of the user. VPN (virtual private network) set-up is also supported where transaction volume or value requires additional security. User passwords and PINs are stored in an encrypted form. Stored transaction data is also encrypted and can be stored beyond the seven years required by the SEC. Access to servers is only permitted through remote desktop connections, and all sessions are recorded. Back-ups of all data are taken daily and stored offline. Transaction logs are also stored offline. Overall performance is monitored across the entire system using a tool (New Relic APM) that uses an automated escalation process to send alerts to the MoMo operations team.

The application that runs on handsets is built by MoMo; therefore, MoMo makes decisions about the adequacy of handset security. When adequate security cannot be provided on a device, MoMo will not support a version of the application for that device. No financial or user data is stored on the handset. A given MSISDN can only be registered to one user. An applicant is not required to prove that s/he is the registered owner of the handset. The proposal indicates that the registration process ensures that the applicant has access to the device using the MSISDN.

S.8 Resiliency

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale:**

The proposal states that target availability for the solution is 100% (S.8.1), and that the system can continue to run while updates are installed. The solution is architected so that separate areas of the system have different functions to ensure resiliency against the failure of any single component (S.8.4). The solution supports horizontal scaling in all areas. The solution will be hosted on MS Azure. MS Azure manages data access with secure multi-factor authentication which delivers data security, privacy, control and transparency, and offers industry level encryption, security, and threat protection. It is the assessors’ interpretation that MS Azure will provide business continuity and disaster recovery planning under an SLA (S.8.2). The proposal does not describe systemic impacts in the event of an outage, but because the solution is closed-loop, these risks are minimal. (S.8.3)

The solution allows for 25% redundancy to accommodate volume spikes rather than the FPTF criteria for a 40% buffer. It has been MoMo’s experience that 25% capacity overhead--measured against average transactional maximums over the busiest minute of a day--is sufficient.
S.9 End-user data protection

**Rationale:**

Personal information is stored in an encrypted form in a Microsoft Azure-provided database; no PII is transmitted as part of the payment (S.9.3). Data at rest is protected by Microsoft’s Transparent Data Encryption (TDE) algorithm, which is compliant with many laws, regulations, and guidelines across several industries. Access to customer data is controlled using a role-based security model, and all sessions are tracked.

S.10 End-user/provider authentication

**Rationale:**

Agency authentication (in person) requires the end-user to show a form of national ID, which is captured as part of the registration process (S.10.5). The solution screens the applicant using AML/KYC/PEP lists and other defined lists as appropriate. To ensure that the applicant is in possession of the device with the MSISDN, the application registration process sends an SMS message containing a PIN, which must be entered to activate the mobile app. Users accessing the solution via the Internet have the same security requirement to validate a second channel. In the transaction flow, session initiation requires the entry of a PIN. Initiators are asked to enter the recipient’s phone number twice to ensure that the payment is routed to the right person (S.10.2). If the recipient does not have a MoMo account, the system will set up an unregistered account; to receive funds, the recipient must either register with MoMo (via an agent or online) or route the money through another Mobile Money system. Agent terminals that connect over the Internet are required to use a 2048-bit client certificate to provide an additional level of authentication.

Authentication options are updated by adding the data type to the system and by specifying its inclusion in the Authentication Options group. Authentication options that are no longer supported are removed from the Options group. All impacted account-holders are notified in advance and advised to sign up for new methods of authentication.

S.11 Participation requirements

**Rationale:**

Participants include end-users, corporations who wish to pay end-users, and agents who provide services for end-users.

The registration process determines end-user participation requirements. The proposal provides a list of unique identifiers that can be presented in person at an agent location or submitted through a website, a phone with a camera, or a PC with a camera. Because the solution operates on a pre-funded construct, no credit check is required. End-users who are blacklisted on OFAC or ONU lists cannot participate; end-users who are grey-listed are closely monitored, and their transactions are reported.
MoMo has a commercial team that negotiates directly with large companies that wish to participate in the system. No minimum requirements are described for government or corporate entities that wish to join the system.

The solution relies on an agent network. Agents accept payments, register customers, take deposits, and pay out withdrawals. Because MoMo is a good-funds model, no credit check is required for agents who wish to participate in the network. Agents’ compliance with requirements will be monitored and managed. No minimum requirements are described for agents who wish to participate in the system.

**Speed (Fast)**

**F.1 Fast approval**

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale:**
The solution is a pre-funded, closed-loop solution that supports transaction approval in less than one second.

**F.2 Fast clearing**

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale:**
The solution is a pre-funded, closed-loop solution that supports transaction clearing in less than one second. The proposal does not describe impacts on transaction times that may occur in use cases involving billers that require end-user account validation prior to payment approval.

**F.3 Fast availability of good funds to payee**

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale:**
Funds are immediately available to the recipient once a transaction is finalized, typically within one second of the payer’s confirming the transaction. When the transaction involves a bill payment to a business user, funds are held until the biller responds to the payment request. The funds are “available” once the payer confirms the transaction, but are not received until the recipient acknowledges the account.

**F.4 Fast settlement among depository institutions and regulated non-bank account providers**

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>
**Rationale**

The solution is a pre-funded, closed-loop solution; funds are exchanged within the solution. Any interaction with depository institutions is related to moving funds into and out of a MoMo account. Settlement of these transactions will rely on the capabilities of the system being used to transfer the funds.

**F.5 Prompt visibility of payment status**

<table>
<thead>
<tr>
<th></th>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale:**

Transactions within the MoMo system clear and settle in less than a second. The payer receives a notification that the account has been debited, and the payee receives a notification that the account has been credited and that funds are now available.

**Legal**

**L.1 Legal framework**

<table>
<thead>
<tr>
<th></th>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale:**

The proposal provides a very thorough response to this section. It considers possible scenarios, as well which laws and regulations would apply to each scenario (L.1.1). Applicable laws and regulations will be considered in creating the solution’s comprehensive terms and conditions.

**L.2 Payment system rules**

<table>
<thead>
<tr>
<th></th>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale:**

Initially, the MoMo organization will develop rules governing payments in the MoMo system. The relevant government and central bank regulators will then review them. Once approved, the rules will be adopted by MoMo.

The solution’s terms and conditions will include requirements, standards/protocols, and procedures that govern the rights and obligations of end-users, the MoMo entity, and any third-party agent or service provider involved in the provision of the MoMo service (L.2.1.). These terms and conditions must be agreed upon prior to sending and receiving payments through the MoMo system and will address all aspects of the solution. MoMo will retain legal liability and responsibility for the solution.
L.3 Consumer protections

<table>
<thead>
<tr>
<th>Rating</th>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
<th>Not Assessable</th>
</tr>
</thead>
</table>

**Rationale:**
The solution supports pre-funded, good-funds payments inside a closed-loop network. No transactions are approved unless funds are available. The proposal states that MoMo end-users will be protected by the EFTA (Electronic Funds Transfer Association) and Regulation E, including liability protection in the event of fraudulent and erroneous payments (L.3.1). The dispute process is well documented in the proposal and relies on the engagement of the CFPB. MoMo can implement additional consumer protections if/as needed (L.3.3).

L.4 Data privacy

<table>
<thead>
<tr>
<th>Rating</th>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
<th>Not Assessable</th>
</tr>
</thead>
</table>

**Rationale:**
The proposal states that MoMo will be subject to the Gramm-Leach-Bliley Act--and perhaps also to Regulation P if designated as a depository institution--and that it will meet all pertinent data privacy requirements (L.4.1). The proposal further states that MoMo will be transparent about describing the end-user information that it captures and how that information will be used and shared (L.4.2). Registration for a MoMo account will require name, address, telephone number, and government-issued ID if registering at an agent location (L.4.3).

Users can enter and change their PII using a series of menus on the application. The exception is unique items of information such as a SSN, which are used to identify individual account-holders in the system. Account-holders can also use menus to change their privacy settings to limit access by call center staff, third parties, and other account-holders.

L.5 Intellectual property

<table>
<thead>
<tr>
<th>Rating</th>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale:**
The proposal describes an IP due diligence review that will take place in the future. It states that MoMo will obtain patent, trademark, copyright, trade secret, and other intellectual property protection for the MoMo system. MoMo has engaged specialist legal firms in the areas of U.S. IP and trademark law. A review will be conducted to ensure that MoMo’s rights to use all areas of its offerings are beyond legal challenge in the U.S. This process was also followed in El Salvador.
Governance

G.1 Effective governance

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale:**

Key aspects of MoMo’s governance have not yet been defined. MoMo states that it will establish the governance structures required to operate the solution in accordance with the applicable laws, regulations, and common practice. MoMo expects to leverage governance lessons learned from its implementation in El Salvador, where governance practices and modifications are being developed and implemented as they become necessary. MoMo will establish a board of directors; a committee supporting the board will develop and manage the terms and conditions that support the solution.

G.2 Inclusive governance

<table>
<thead>
<tr>
<th>Very Effective</th>
<th>Effective</th>
<th>Somewhat Effective</th>
<th>Not Effective</th>
</tr>
</thead>
</table>

**Rationale:**

A governance committee will be established to manage solution terms and conditions. The committee is expected to include one or more user representatives. Subject matter counsel will be retained to ensure that terms and conditions conform to applicable U.S. law. The committee will be authorized to establish advisory groups as needed that will include end-users and/or other stakeholders to advise the committee on matters relating to terms and conditions.