UN CDF MM4P

Building an In-House Mobile Money Platform

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Background

One of the first critical steps to build a mobile financial services (MFS) business is to set up a robust, efficient mobile money platform. The platform is crucial to ensure safe, seamless transactions, to preserve data privacy and to offer basic as well as more complex products such as insurance, savings and credit. Thus, the first question that a provider faces when setting up such a business is whether to buy an off-the-shelf platform or to develop a platform in-house. This paper consolidates learning by MM4P from supporting one of its partners, a non-bank payment service provider in Nepal.

The business aspect

Developing an in-house mobile money platform is a strategic decision. It should be based on an assessment of the provider's current capacity and future plans. Technology development comes later, only after the organization is clear on its strategic vision for the usage of the platform.

From a business perspective at the macro level, there are both pros and cons for developing an in-house platform (see table 1 and figures I and II for details on how the provider may make this strategic decision). The biggest trade-off is **cost versus future business potential**.
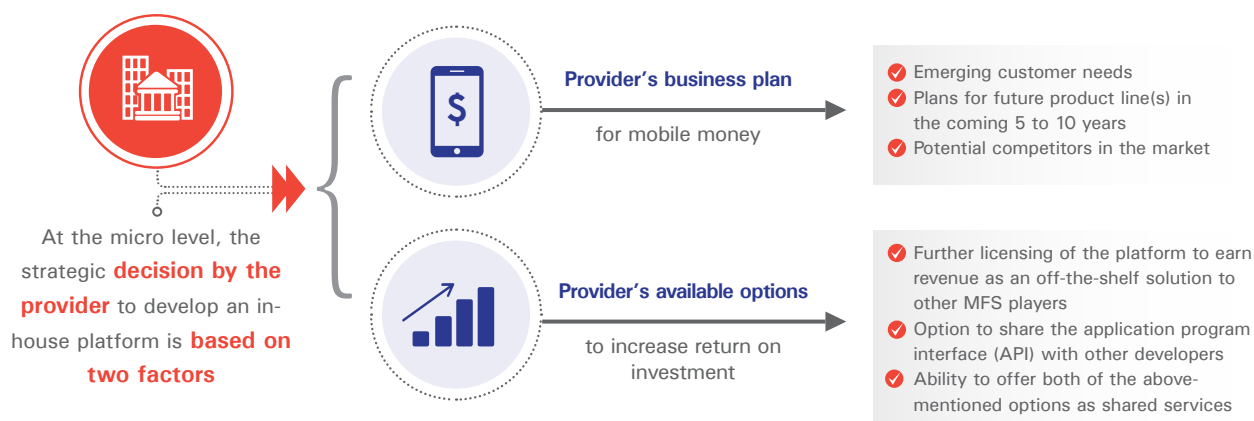
Table 1
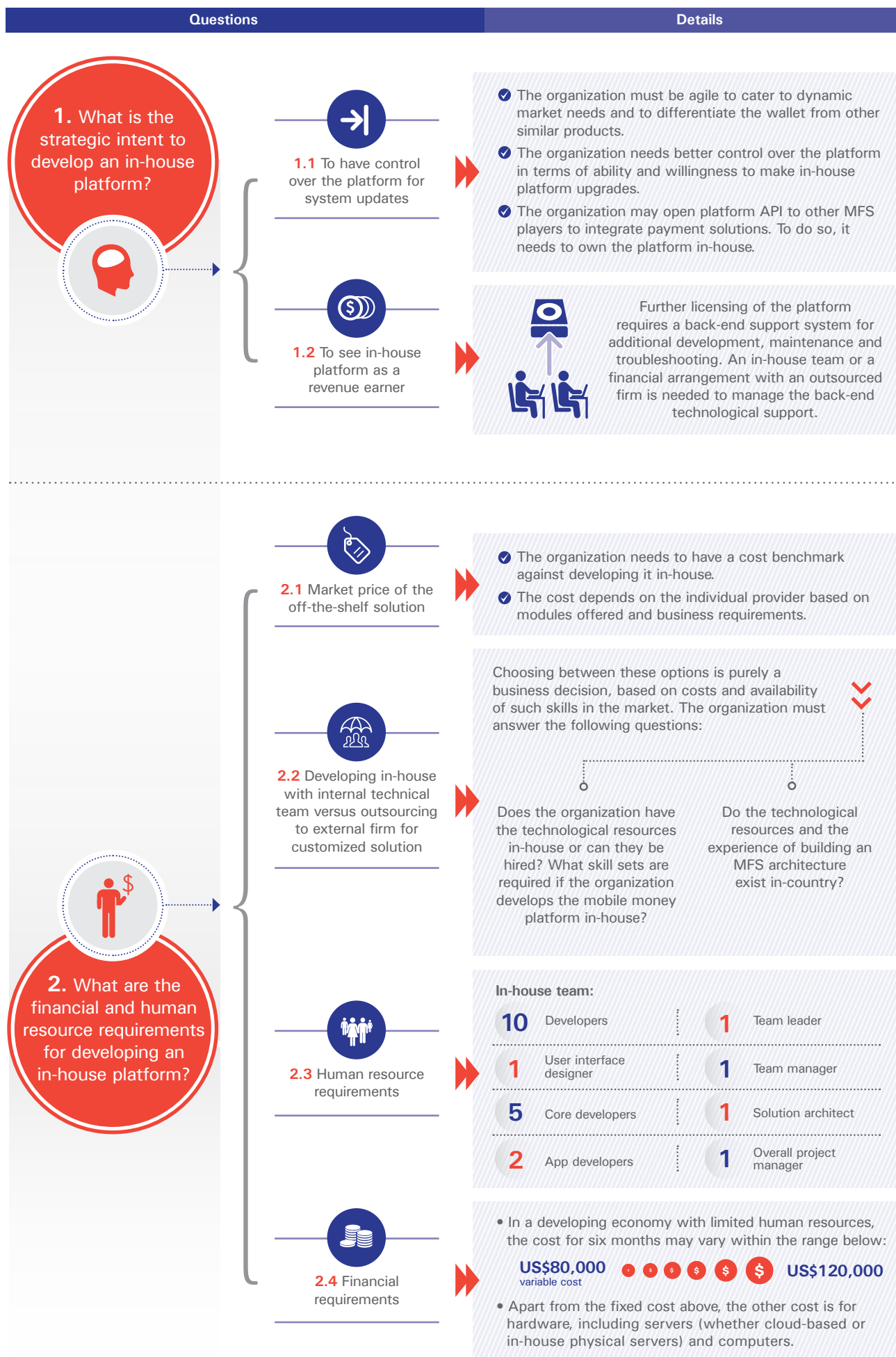Pros and cons of developing an in-house mobile money platform

+ Pros	- Cons
• Full control over product design and scope for customization based on market needs • Timely in-house platform updates as per system requirements • Added revenue source as the provider can further license the technology to other MFS players	• High cost of having a dedicated internal team of technical experts • Continuous testing and time-consuming system revision • Platform inefficiencies due to limited knowledge by internal team members of the latest technical innovations in the market

Figure I
Strategic decision by the provider

At the micro level, the strategic **decision by the provider** to develop an in-house platform is **based on two factors**

Provider's business plan for mobile money
- ✓ Emerging customer needs
- ✓ Plans for future product line(s) in the coming 5 to 10 years
- ✓ Potential competitors in the market

Provider's available options to increase return on investment
- ✓ Further licensing of the platform to earn revenue as an off-the-shelf solution to other MFS players
- ✓ Option to share the application program interface (API) with other developers
- ✓ Ability to offer both of the above-mentioned options as shared services

Figure II
Strategic questions when considering development of an in-house mobile money platform

Questions	Details

1. What is the strategic intent to develop an in-house platform?

1.1 To have control over the platform for system updates

- ✓ The organization must be agile to cater to dynamic market needs and to differentiate the wallet from other similar products.
- ✓ The organization needs better control over the platform in terms of ability and willingness to make in-house platform upgrades.
- ✓ The organization may open platform API to other MFS players to integrate payment solutions. To do so, it needs to own the platform in-house.

1.2 To see in-house platform as a revenue earner

Further licensing of the platform requires a back-end support system for additional development, maintenance and troubleshooting. An in-house team or a financial arrangement with an outsourced firm is needed to manage the back-end technological support.

2.1 Market price of the off-the-shelf solution

- ✓ The organization needs to have a cost benchmark against developing it in-house.
- ✓ The cost depends on the individual provider based on modules offered and business requirements.

2.2 Developing in-house with internal technical team versus outsourcing to external firm for customized solution

Choosing between these options is purely a business decision, based on costs and availability of such skills in the market. The organization must answer the following questions:

Does the organization have the technological resources in-house or can they be hired? What skill sets are required if the organization develops the mobile money platform in-house?

Do the technological resources and the experience of building an MFS architecture exist in-country?

2. What are the financial and human resource requirements for developing an in-house platform?

2.3 Human resource requirements

In-house team:

10	Developers	1	Team leader
1	User interface designer	1	Team manager
5	Core developers	1	Solution architect
2	App developers	1	Overall project manager

2.4 Financial requirements

- In a developing economy with limited human resources, the cost for six months may vary within the range below:

US$80,000 variable cost ● ● ● $ $ $ **US$120,000**

- Apart from the fixed cost above, the other cost is for hardware, including servers (whether cloud-based or in-house physical servers) and computers.

Development roadmap

On the technological front, the first step is to sketch the basic requirements or solution architecture. Based on the experience of MM4P with its partner, further development of the platform can be envisioned in three phases (see table 2).
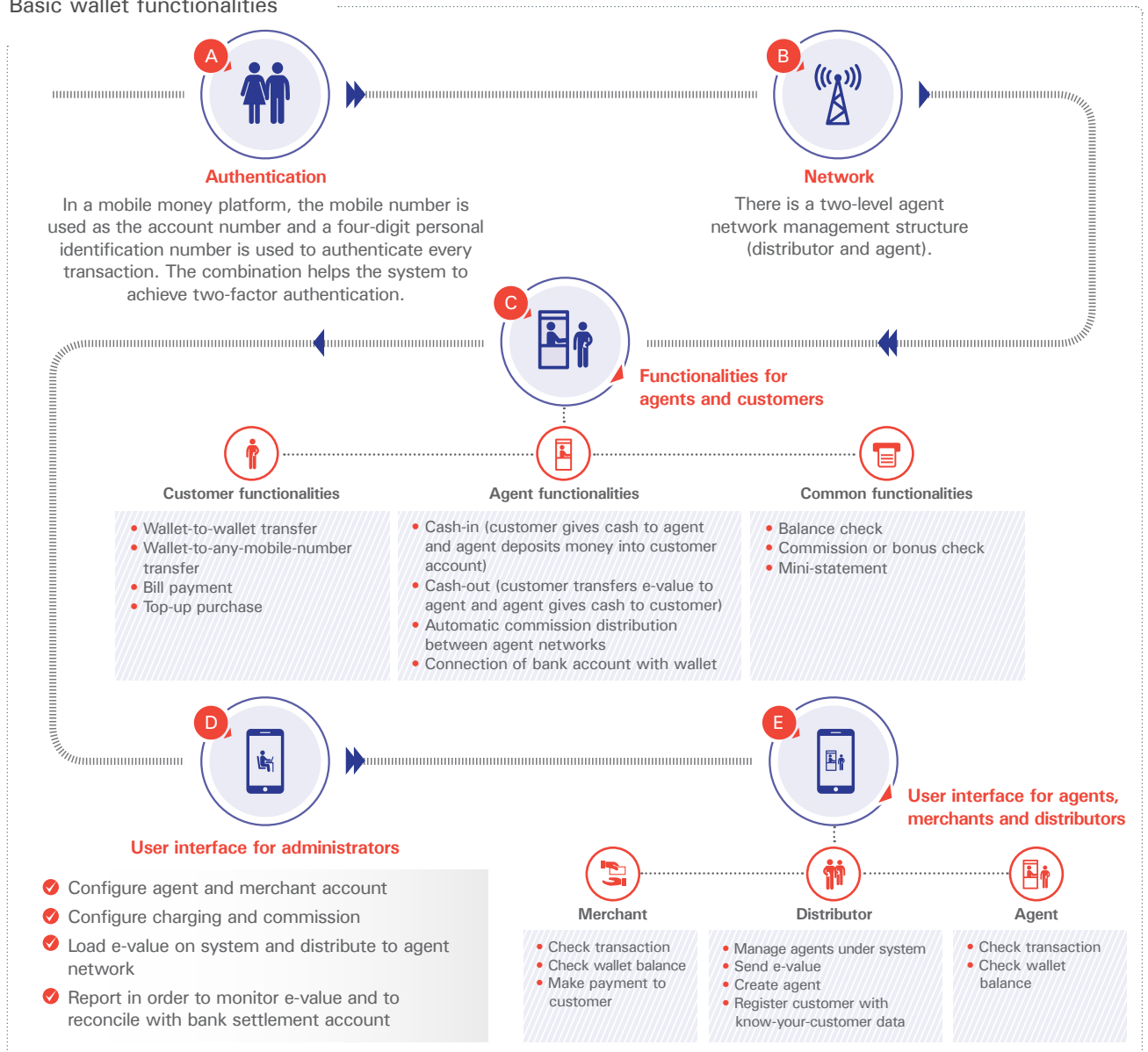
Table 2
Services offered during different development phases of in-house mobile money platform

Phases	Mobile money services offered
Phase 1 Basic wallet	Cash-in, cash-out, person-to-person, person-to-person off-net, balance check, mini-statement, mobile top-up, bank-to-cash and cash-to-bank, charging and commission module, audit log
Phase 2 Advanced solution I	Bonus wallet, bulk payments, insurance, wallet-linked savings, bonus wallet
Phase 3 Advanced solution II	Credit, bulk collection, other social networking app integration

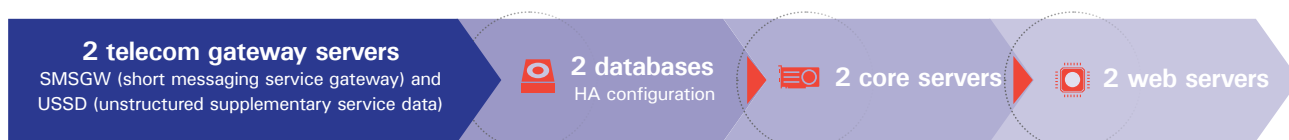A basic wallet would have the functionalities outlined in figure III.

Figure III
Basic wallet functionalities

A — Authentication

In a mobile money platform, the mobile number is used as the account number and a four-digit personal identification number is used to authenticate every transaction. The combination helps the system to achieve two-factor authentication.

B — Network

There is a two-level agent network management structure (distributor and agent).

C — Functionalities for agents and customers

Customer functionalities
- Wallet-to-wallet transfer
- Wallet-to-any-mobile-number transfer
- Bill payment
- Top-up purchase

Agent functionalities
- Cash-in (customer gives cash to agent and agent deposits money into customer account)
- Cash-out (customer transfers e-value to agent and agent gives cash to customer)
- Automatic commission distribution between agent networks
- Connection of bank account with wallet

Common functionalities
- Balance check
- Commission or bonus check
- Mini-statement

D — User interface for administrators
- ✓ Configure agent and merchant account
- ✓ Configure charging and commission
- ✓ Load e-value on system and distribute to agent network
- ✓ Report in order to monitor e-value and to reconcile with bank settlement account

E — User interface for agents, merchants and distributors

Merchant
- Check transaction
- Check wallet balance
- Make payment to customer

Distributor
- Manage agents under system
- Send e-value
- Create agent
- Register customer with know-your-customer data

Agent
- Check transaction
- Check wallet balance

Other complex products such as credit or savings can be built on top of the basic product. Basic wallet functionalities can be developed with a team of 10 developers in a 90-day span in three sprints.

System requirements

It is recommended that, to achieve 99.99 percent service uptime, the system should be an HA (high availability) system. Following is the basic structure of a mobile money system:

2 telecom gateway servers
SMSGW (short messaging service gateway) and USSD (unstructured supplementary service data)

2 databases HA configuration

2 core servers

2 web servers

Security from a customer protection perspective

Platform integrity and security is critical since the MFS provider is dealing with customers' money and any security gap could lead to reduced customer trust in the provider and in MFS as a whole. Thus, it is imperative for the provider to follow international standards and to become certified on information security, which would entail an additional cost for the organization.

Other critical technological factors

The provider needs to consider the following factors to achieve efficient operations:

1. There needs to be constant dialogue with the business team to understand its requirements, which means having a continuous process of engagement, exploration and identification of requirements and their flows.

2. It is suggested that the development process, user acceptance test results, codes and flow charts be well documented for further reference, regulator audit and/or third-party certification.

Important considerations

- To address **critical business needs**, the organization should hire a business analyst or a digital financial services expert to communicate with the technical team in a timely manner.

- To prevent **system-level fraud**, the organization should hire a solution expert during platform development as a project manager, one who is well aware of the security and data safety requirements for the platform.

- When developing the system, the organization must clearly understand the **e-value chain** of the mobile wallet system, which means understanding the flow of e-value between different wallets or bins and their audit trail requirements.

- The organization should recognize that there will be **differences of opinion** between the business and technical teams. The business team often prefers to launch the platform at the earliest possibility; however, the technical team may recognize that meeting technical requirements necessitates a time-consuming design and testing phase to deliver a safe and secure platform.

- Ever-evolving **reporting requirements** can hinder the planned development schedule. The organization can mitigate this risk by having leadership and the internal team finalize and sign off required accounts and reports during the system design phase.

Conclusion

In-house mobile money platform development is not an easy task. Merely seeing it as a technology back-end issue would not be the right perspective; rather, the organization should see it as part of its overall MFS plans. For emerging competitive MFS markets, an in-house platform provides agility, control over product development based on market needs, and an opportunity to further license it. However, developing it in-house entails a financial burden, which may be more for an off-the-shelf platform. Thus, the MFS provider must examine the trade-off between in-house and off-the-shelf platforms in light of strategic intent and future benefits against present cost.

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This study is a general introduction to the steps MM4P followed with its partner organization in Nepal. For a more extensive discussion of such platforms, kindly refer to the GSMA study 'Platforms for Successful Mobile Money Services.'