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Mobile Financial Services

Mobile Financial Services

Business Ecosystem Scenarios & Consequences

Summary Document

Edited By

Juha Risikko & Bishwajit Choudhary

Mobey Forum

Mobile Financial Services Ltd.

Executive Summary

Nowadays, the financial sector has three key requirements for successful mass-market mobile financial services: the services must be (1) easy-to-use, (2) secure and trusted, and (3) based on commercially viable business models. While a wide range of enabling technologies have improved usability, the lack of a hardware-based Security Element (SE) in mobile handsets as well as the absence of feasible business models to support its implementation have left the financial sector concerned. The financial sector also foresees that a dedicated hardware-based SE can greatly facilitate secure mobile proximity payments and remote authentication through mobile handsets. Consequently, Mobey Forum initiated the Mobile Financial Services (MFS) Business Ecosystem Analysis during 2005 in order to understand the complexities of this environment and to understand the main future scenarios.

Mobey Forum defines a MFS Business Ecosystem as "*an environment in which the stakeholders throughout the supply chain achieve a good balance between competitive freedom and strategic dependencies to assure an easy uptake of mobile financial services in the international landscape and freedom of choice for the end users and merchants.*" The two key functional roles are SE Issuer and Platform Manager. The business ecosystem is largely defined by which industry players act in these roles and by the relationship between them. The SE Issuer issues a secure platform to store financial and other applications. The Platform Manager manages the lifecycle of the platform.

Mobey Forum identified three most relevant business ecosystem scenarios. Choice of the preferred ecosystem depends on the market scope targeted and inter-sector relations, particularly between the financial and telecom sectors.

The highest international potential lies within the ecosystem scenario, where global personalization bureaus take the role of Platform Manager. The SE may be an embedded chip or Secure Memory Card (SMC) sold through independent retailers. To realize this scenario, a strong drive is required from personalization bureaus.

National solutions can be based on the ecosystem scenario where mobile operators act both as SIM Issuers and Platform Managers. The scenario may take place in markets where the key players have good trust and business relations. However, as market scope expands from niche to national or international, the business ecosystem becomes more complex due to the increased number of stakeholders. Mobile operators are the key drivers in this business ecosystem scenario.

Niche solutions can be based on banks or other service providers acting as Platform Managers. Banks, or other service providers, that want to launch mobile proximity services fully independent of any third party may prefer this scenario. However, too many Platform Managers will lead to a more complex and fragmented market. Such solutions are likely to attract certain niche segments, but they are unlikely to become mass-market solutions.

1 Introduction

1.1 *Background*

During 2005, Mobey Forum conducted a scenario analysis on the Mobile Financial Services (MFS) Business Ecosystem. This document summarizes the main findings of the Ecosystem analysis. The full document is available for Mobey Forum members only.

Today, the financial sector worldwide must meet three requirements in order to develop successful mass-market mobile financial services:

(1) Services must be easy to use

(2) Services must be secure and trusted

(3) Services must be based on commercially viable business models

While a wide range of enabling technologies (such as TCP/IP, high resolution color screens, Near Field Communications, etc.) have made MFS more presentable and easier to use, the lack of a, preferably, hardware-based SE in mobile handsets has left the financial sector concerned. In order to understand how the requirements can be met in the future and in order to facilitate commercial implementations, Mobey Forum initiated a two-phase study on SE alternatives and business ecosystem scenarios.

> *Security Element :*
>
> *SE is a platform where applications can be installed, personalized and managed preferably over-the-air. It is a combination of hardware, software, interfaces and protocols that enable secure storage and the use of credentials for payments, authentication and other services.*

In the first phase of the Mobile Financial Service Business Ecosystem Analysis, Mobey Forum compared and contrasted six different SE alternatives: SIM, SMC, software-based solution, Advanced Secure USB tokens, embedded chip and removable chip. As the result of the SE analysis, Mobey Forum short-listed three SE alternatives as the having the highest potential for use both in proximity and in remote MFS environments:

- (U)SIM ((Universal) Subscriber Identity Module) in this context means the physical smart card where the SIM application resides.
- The SMC includes memory, embedded smart card element and smart card controller. In other words, it is a combination of a memory card (e.g. MMC, SD, etc.) and a smart card. SMC can also be referred to as a secure flash card.
- Embedded chip is an irremovable chip that has smart card level security and functionality. The chip is embedded in a mobile device during its manufacture.

Mobey Forum published an executive summary of the SE analysis for the industry on September 5, 2005. The SE analysis helped Mobey Forum to improve its understanding of the characteristics of each SE. The short-listing of three SEs also improved the focus for the second phase of the study.

In the second phase of the analysis, Mobey Forum concentrated on the short-listed SE alternatives, investigated different business models for wide scale implementation of the SEs and described their consequences on the MFS ecosystem. The actual implementation processes of the SE, the roles of the stakeholders and the inter-relations between them are among the key issues defining a sustainable MFS Business Ecosystem. This part of the work is called MFS Business Ecosystem Analysis.

1.2 *The Goals of Mobile Financial Services Business Ecosystem Analysis*

The goals of the MFS Business Ecosystem Analysis are

> - *To formulate conceptual and generic business ecosystem scenarios*
> - *To describe the roles of, and inter-dependencies between, the key stakeholders* in various ecosystem scenarios
> - *To evaluate the viability of various business ecosystem scenarios* in different market environments through cross-industry discussion

1.3 *Use Cases*

The main reason and use case that drives the mobile telecom industry to have a SE within mobile devices is to enable mobile proximity services. Together with ticketing services, mobile proximity payments are commonly considered the most important proximity service use case. Near Field Communication (NFC) technology is expected to enable contactless RFID-based communication between mobile devices and Point of Sale (POS) terminals. Many proximity services require the same level of security that is today achieved through smart card based solutions .

Therefore, the main scope of the study involves mobile proximity payments. However, the same SE can and should be used for other purposes of the financial industry, such as

- Storing authentication and digital signature credentials
- Storing payment credentials for remote payment and financial services

When compared to other form factors such as plastic cards or key fobs, there are several key differences in enabling proximity payments with mobile devices (see Figure 1).
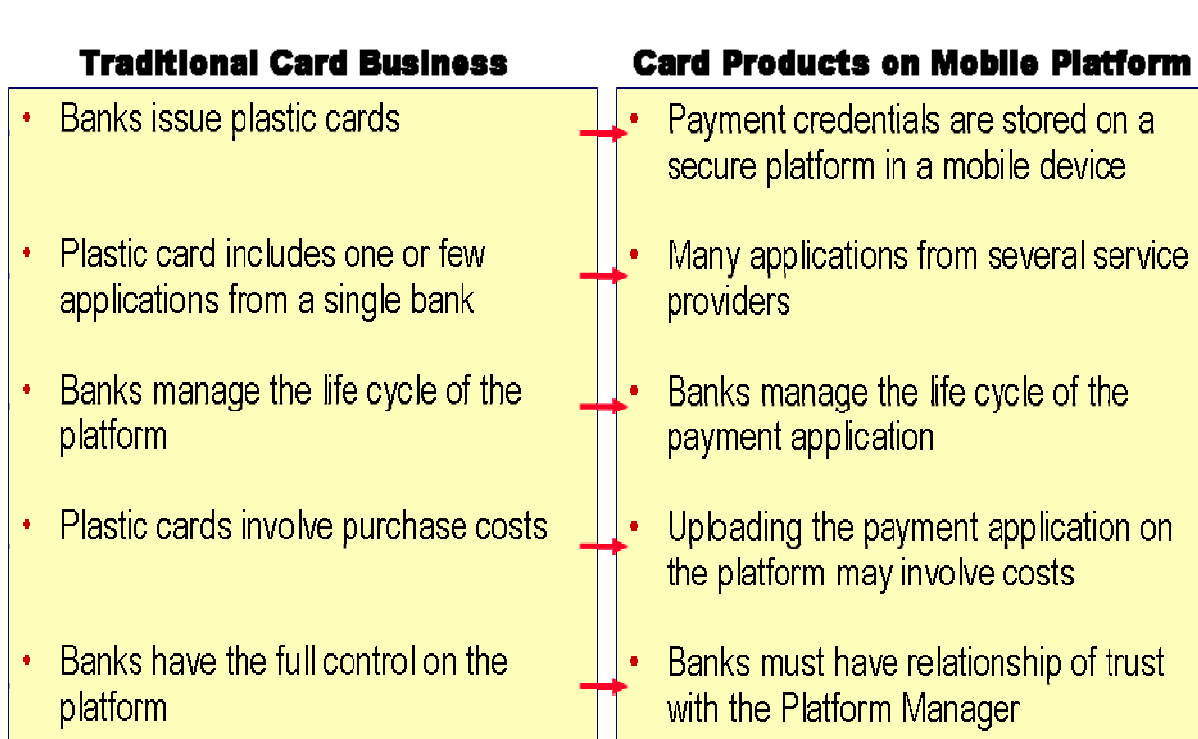
Traditional Card Business	Card Products on Mobile Platform
• Banks issue plastic cards	• Payment credentials are stored on a secure platform in a mobile device
• Plastic card includes one or few applications from a single bank	• Many applications from several service providers
• Banks manage the life cycle of the platform	• Banks manage the life cycle of the payment application
• Plastic cards involve purchase costs	• Uploading the payment application on the platform may involve costs
• Banks have the full control on the platform	• Banks must have relationship of trust with the Platform Manager

Figure 1. Differences in bringing card payment products to the mobile platform

1.4 Abbreviations

MFS = Mobile Financial Services

NFC = Near Field Communication

POS = Point of Sale

RFID = Radio Frequency Identification

SE = Security Element

SMC = Secure Memory Card

TCP/IP = Transmission Control Protocol/Internet Protocol

(U)SIM = (Universal) Subscriber Identity Module

2 Mobile Financial Services Business Ecosystem

At the start of the business ecosystem analysis, the concept of MFS Business Ecosystem, as defined in industry reports, was found to be somewhat vague. The definition mostly focused on balancing cooperation and competition between different parties, especially between the financial sector and mobile operators. There was a clear need to make a more sound definition for the MFS Business Ecosystem and to understand the scope and limits of cooperation and competition between the parties involved.

> ***Mobey Forum defines a Mobile Financial Services Business Ecosystem as***
>
> *"An environment in which the stakeholders throughout the supply chain achieve a good balance between competitive freedom and strategic dependencies to assure an easy uptake of mobile financial services in the international landscape and freedom of choice for the end users and merchants."*

The new definition for the MFS Business Ecosystem helps to take a broader view than the traditional operator-bank centered approach. Shifting the focus on the whole MFS supply chain enabled us to identify the full consequences of different business models, specific areas best managed by market forces (and others by competition) and the relevance of different SE alternatives in different ecosystem scenarios (see Figure 2).
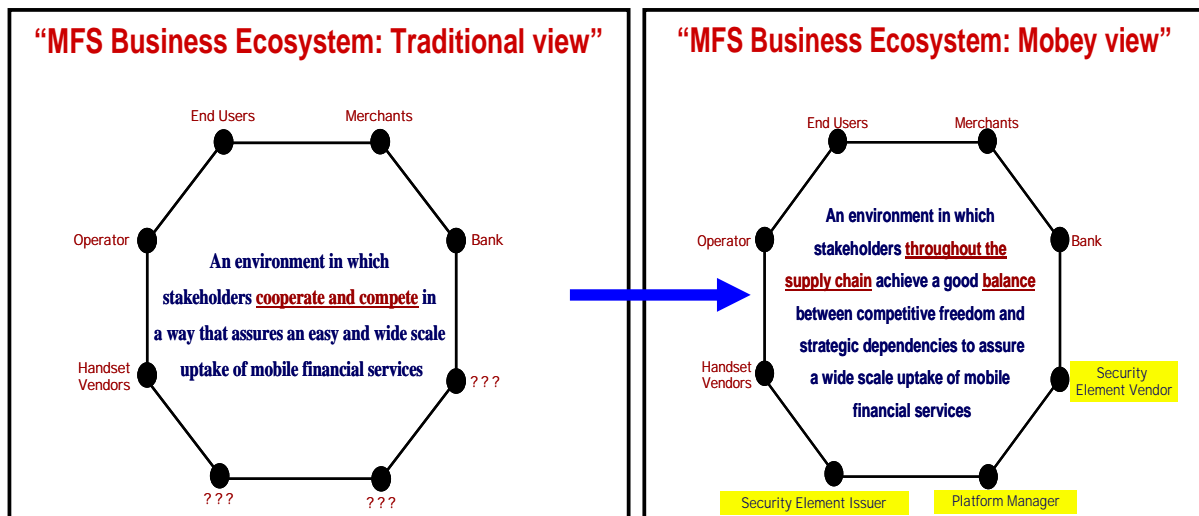

Figure 2. Defining the Mobile Financial Services Ecosystem

The new MFS Business Ecosystem definition allowed us to

- ***Embrace*** three new stakeholders (Platform Manager, SE Issuer and SE Vendor), which had been overlooked in earlier MFS ecosystem studies
- ***Focus*** on SE and key supply chains
- ***Include*** various SE scenarios to reflect different implementation models worldwide

2.1 *Framework*

The framework for the MFS Business Ecosystem Analysis is illustrated in Figure 3. The generic model is divided in two main parts:

1. **SE supply chain** defines how the end user gets the physical SE into his/her possession. As mentioned earlier, from the first phase of the work (SE evaluation), we identified that three specific SE alternatives have the highest potential of becoming a general purpose SE for use both in the proximity and in the remote environments. These SE alternatives were (U)SIM, SMC (SMC) and Embedded Chip.

2. **Key supply chain** defines how cryptographic keys (hereafter referred to as "keys") are transferred from the SE vendor to Platform Manager and further used to enable the management (installation, activation, deactivation) and use of applications utilizing the SE. The definitions for the different roles of the framework are provided in the section below.

The SE supply chain is different, based on what is used as the SE. The SE type will also heavily affect who is in the best position to become Platform Manager.
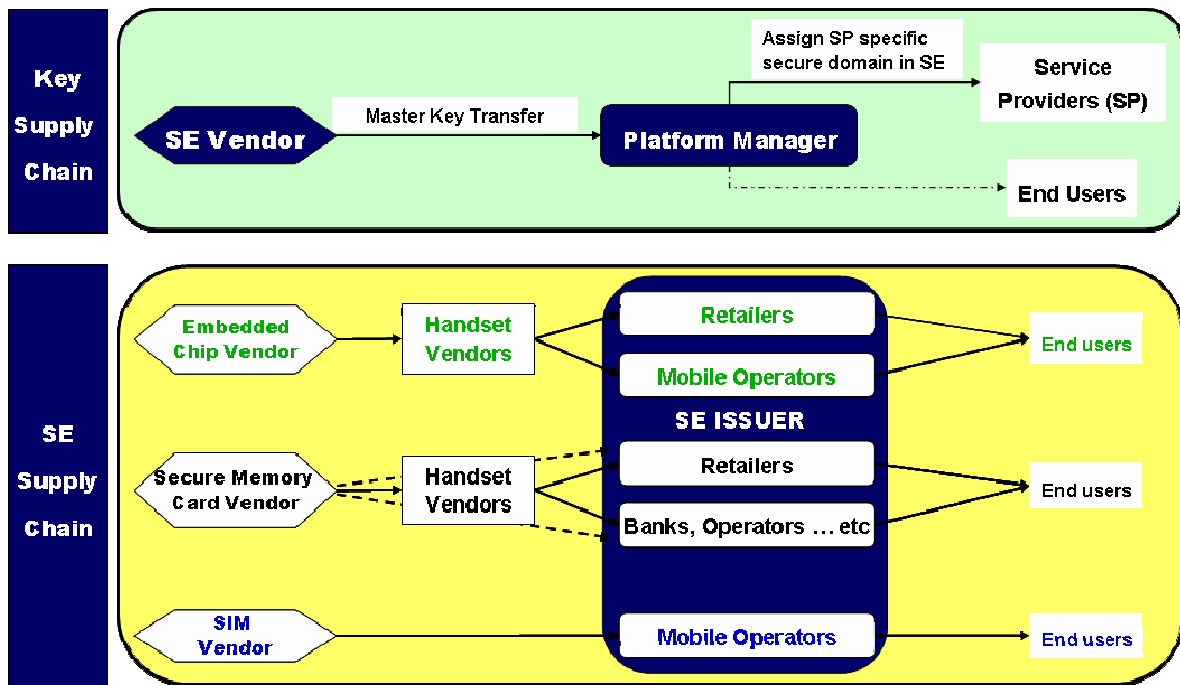

Figure 3. Generic Framework for the MFS Business Ecosystem

2.1.1 The Key Functional Roles in the Ecosystem

As noted in above, we identified two functional roles in the framework: Platform Manager and SE Issuer (SE Issuer). The Business Ecosystem is defined by which stakeholders are in these functional roles and by their relationship to each other. The same player may or may not be in both roles (as Platform Manager and SE Issuer). The functional roles are defined as:

Platform Manager:

1. The Platform Manager owns the cryptographic keys used to control the SE platform. The master key is generated during the chip personalization process by the personalization bureau. The master key can only be changed by the Platform Manager.

2. The Platform Manager has the following tasks

   - It allows authorized service providers to install an application on the SE, preferably over-the-air or through some other process. The Platform Manager may use the master key to divide the platform into several secure domains and delegate control of each secure domain to the service provider, thus enabling it to manage the application's life cycle.

   - It can disable the platform or an application when necessary. Service providers may manage the application life cycles of their respective applications. The Platform Manager has no access to application-specific information.

   - The Platform Manager may offer an end user service in order to block the platform (e.g. when a mobile device with a SE is lost or stolen), or this can be managed through a service provider's or SE Issuer's customer service center. The Platform Manager may also offer a "recovery service" which enables registering services easily on a new SE.

   - The Platform Manager can be seen as a "trusted third party" as it assures smooth life cycle management of the SE.

The Platform Manager business model can be based on revenue streams from four different sources: (1) service providers pay for getting their application/credentials on the SE, (2) SE Issuers outsource the management of the SE to the Platform Manager (in this case, SE Issuers charge service providers and/or end users), (3) end users pay (e.g. a monthly or annual fee) for an attractive service package made available to their mobile devices (SE platform) and (4), the business model may also be linked to other businesses that the entity, having the role of Platform Manager, may have (in which case the business model is more complicated).

The Platform Manager has to invest in a smart card application management system in order to enable its operation. The Platform Manager has to meet all the requirements that service providers, regulators and other possible parties set on the platform and processes that their services need in order to work. For example, the requirements of Visa, MasterCard, other credit card organizations, issuing banks and regulators have to be met in order to enable the use of credit card products. To develop and operate such a system that meets all technical requirements and follows required policies may require significant investment. Customer service has to be managed in cooperation with service providers and SE Issuers.

The Platform Manager needs a physical SE that it controls. If the SE Issuer is a different party than the Platform Manager, the Platform Manager and the SE Issuer have to agree on the business model that will define who is making the business agreements with the service providers and end users and whether revenue-sharing arrangements will be used. The business model is simpler when the SE Issuer and Platform Manager are the same entity.

The **SE Issuer** is the entity that delivers the physical SE to the end user. The framework diagram above mentions some of the potential SE Issuers, such as a mobile operator, bank or retailer.

2.1.2 The Key Stakeholders in the Ecosystem

- **An SE Vendor** personalizes and possibly manufacturers the SE. Many different companies may be involved in this process (e.g. one that is manufacturing the chip and another that is acting as a personalization bureau). In the proposed Mobey Forum conceptual model, these two processes are seen within a single entity for the sake of simplicity ("SE Vendor"). The SE Vendor also produces the initial cryptographic keys ("master keys") that will be used later to control the SE platform. It is assumed that the keys are symmetric.

- **A service provider** offers services for end users. Services are utilized with the help of keys or applications that can be downloaded to, stored in and used from the SE. The Platform Manager enables the service provider to use the SE.

- **A bank** is a service provider for financial services such as contactless proximity payments, remote payments and authentication. It may have the role of SE Issuer and Platform Manager.

- **A mobile operator** can have the role of SE Issuer, Platform Manager and service provider. The operator also provides the infrastructure for communication in remote applications.

- **An end user** uses the services offered by service providers with SE enabled mobile devices.

- **A mobile device manufacturer** produces mobile devices that support the use of SEs in proximity and remote environments.

- **A retailer** sells mobile devices and SEs independently of other players.

3 Scenarios

In the Business Ecosystem Analysis, Mobey Forum identified three main scenarios with varying characteristics. Different scenarios may be applied in different market conditions and scopes (international, national or niche markets). Although other scenarios were identified during the analysis, the following three scenarios describe the main alternatives for how the future of mobile proximity payments especially but also other proximity services are expected to evolve. The practical implementations may have characteristics from different scenarios.

3.1 *Scenario 1: Operator Centric Model*

In this scenario, each mobile operator issues SIM cards with the required security functionalities. Mobile operators also have the role of Platform Manager. In other words, they manage the SE (SIM) and enable service providers, including banks, to use a SIM card as a SE for proximity and/or remote services (see Figure 4).
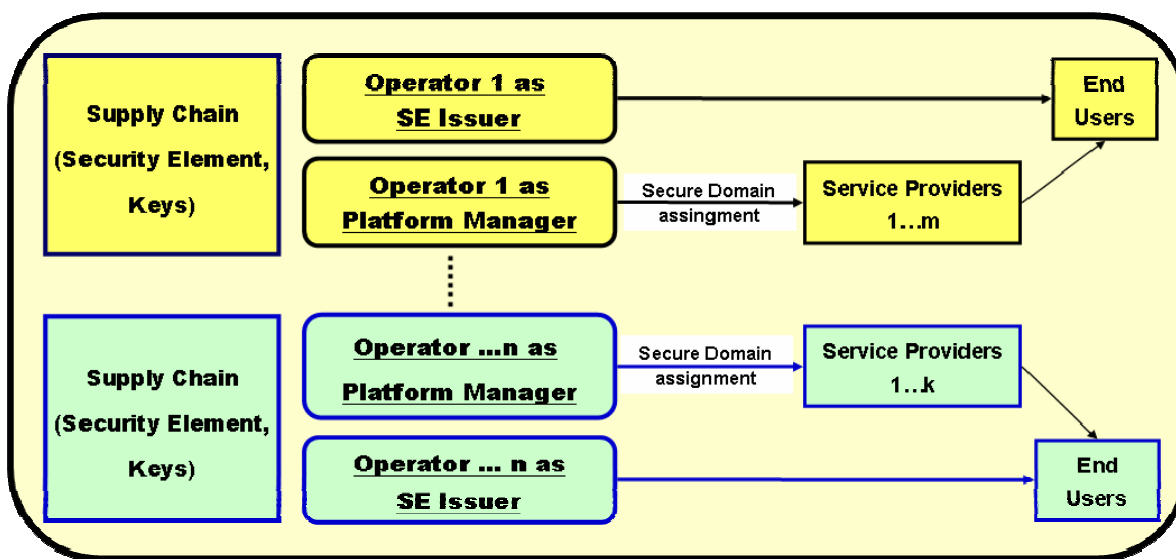

Figure 4. Each mobile operator as SIM Issuer and Platform Manager

Each merchant needs to make an agreement with each Platform Manager (mobile operator) in order to reach all potential end users. The higher the number of Platform Managers then the higher the number of agreements that are required (one-to-one). In European markets, there are usually 3-4 mobile network operators per national market and various mobile service operators without their own network. For international service providers, such a business environment is very complex because they have to make agreements with the Platform Managers in all countries in order to serve all their end users. Therefore, the solution can be seen as especially suited to national implementations. Banks and operators have found successful cooperation models in some national markets (e.g. Norway, Sweden, Spain and Belgium), and the likelihood for successfully establishing this ecosystem is higher. Finding a suitable business model for this ecosystem scenario will be very difficult in markets where inter-sector cooperation has been traditionally challenging.

In addition to new direct revenues, mobile operators may gain other benefits such as lower churn rate and increased usage of mobile services. This may boost the entire market in cases where operators move part of the benefits to service providers through attractive market entry conditions. Consumers may find the market place confusing if service providers have exclusive deals. In practice, it is important to have freedom of choice for frequently used services such as financial services, public transport etc. independent of Platform Manager (mobile operator). In less critical service areas, it is acceptable to have Platform Managers offer different service packages.

Proximity services need a physical interface between a SIM (as SE) and NFC chip or antennae (in the event that NFC capability is integrated into the (U)SIM) set). This brings some level of uncertainty; especially the timing of commercial products as standards has to be specified and supported by main stakeholders. Proprietary implementations using SIM as SE in proximity services have already been demonstrated. Furthermore, mobile operators in national/international markets should agree on a consistent means for implementing SE and related processes in order to guarantee that a service provider's applications function correctly across all operator platforms. Some uncertainty also lies in meeting the financial sector's security and regulatory requirements.

3.2 *Scenario 2: Bank/Service Provider Centric Model*

In this scenario, banks and other non-mobile operators issue SMCs with the required security functionalities and manage the platform. There is also a possibility that instead of a bank issuing the SMC, the end user buys the SMC and registers it to his/her bank. In Section 3.2, we use the term "bank" more generally to represent non-telecom players in the role of SE Issuer and Platform Manager because these terms would have the most natural fit among service providers to enter this business due to security requirements and large customer bases. Banks would need such SEs mainly to enable mobile proximity payments and authentication for remote services (see the Figure 5 below).
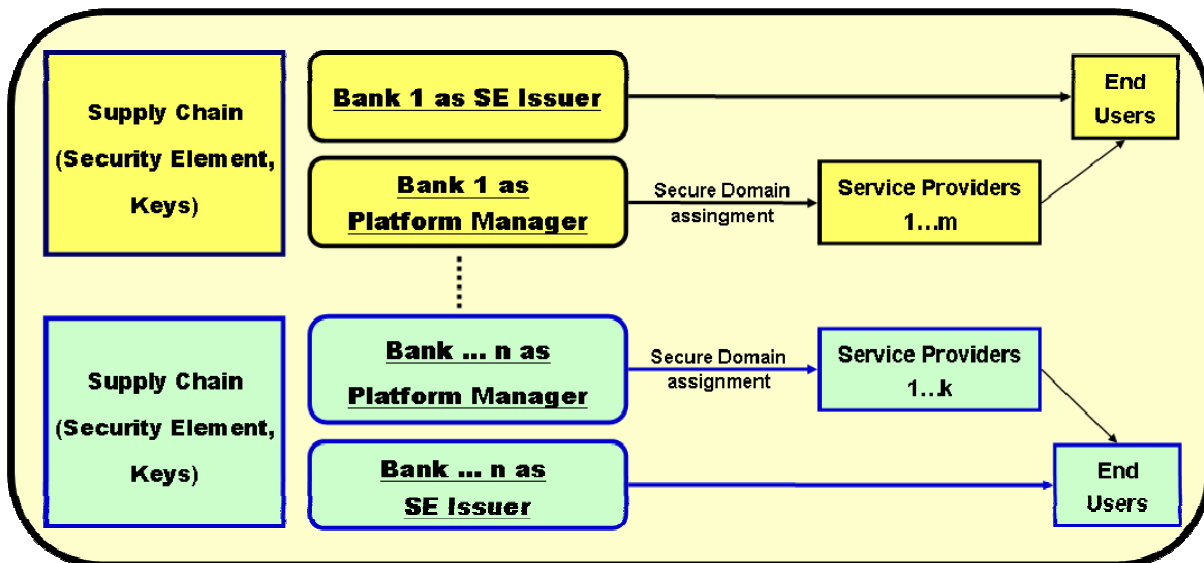

Figure 5. Each "bank" as Secure Memory Card Issuer and Platform Manager

The implications for merchants and service providers are quite similar to Scenario 1. Each merchant needs to make an agreement with each Platform Manager in order to reach all potential end users. There is a risk

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that market fragmentation will be significantly higher than in Scenario 1 because any service provider can actually become a Platform Manager. Each bank has complete business independence to provide mobile proximity and authentication services with the help of SMC. No agreements are needed with third parties. Consumers may find the market place confusing if service providers have exclusive deals. In practice, it is important to have freedom of choice for frequently used services such as public transport independent of the Platform Manager. In less critical service areas, it is fine for Platform Managers to offer different service packages.

Commercial feasibility will bring forth the main challenges in this scenario: i.e., who is willing to cover the relatively high unit cost of SMC. A bank has to estimate carefully how to finance the issuance of relatively costly SMCs and how to expand its existing card management system to cover over-the-air management of the smart cards that reside within mobile devices. Another option may be to let end users buy the SMC and register it to a bank as a part of financial service activation process.

Mobile devices need to support the security features of SMCs. This raises some level of uncertainty, especially concerning the timing of the commercial products fitting this scenario. A physical interface between the SMC (as SE) and NFC chip set (or antennae if NFC capability is integrated into the SMC) is needed. The ease of service implementation on different mobile handsets depends on the standardization level of the SMC and the interfaces it uses. There should be cooperation between Platform Managers in order to follow common rules and specifications for the implementation of SEs.

This scenario will not meet all market needs and it can be regarded more as a niche solution implemented by individual companies. However, it may co-exist with other scenarios. Together, they can meet the different market needs of different players and markets.

3.3 *Scenario 3: Neutral Trusted Third Party as Platform Manager*

The two scenarios presented above studied two ecosystem scenarios based on the different roles of banks and mobile operators. Since banks and operators may have competing ambitions in the market space of MFS and want to control the SE for positioning and business case reasons, Scenarios 1 and 2 may be realized only at national or niche market scales. In Scenario 3, a neutral trusted party takes the role of Platform Manager. Interestingly, the SE Vendors to banks (for smart card based debit and credit payments) are the same trusted organizations that supply SIM cards to operators.

Therefore, the SE Vendors seem to be well positioned in terms of business relations and technical expertise in the banking and operator community in order to take the role of the industry-neutral, technically intensive function of Platform Management. There also a relatively small number of SE Vendors in the international market, which makes the business model in international scope more simple. However, they are not the exclusive alternative for this role. This scenario has the high potential to enable the international adoption of mobile proximity payments, other mobile financial services and other non-financial proximity services requiring hardware based SE. The cooperative model is illustrated in Figure 6.
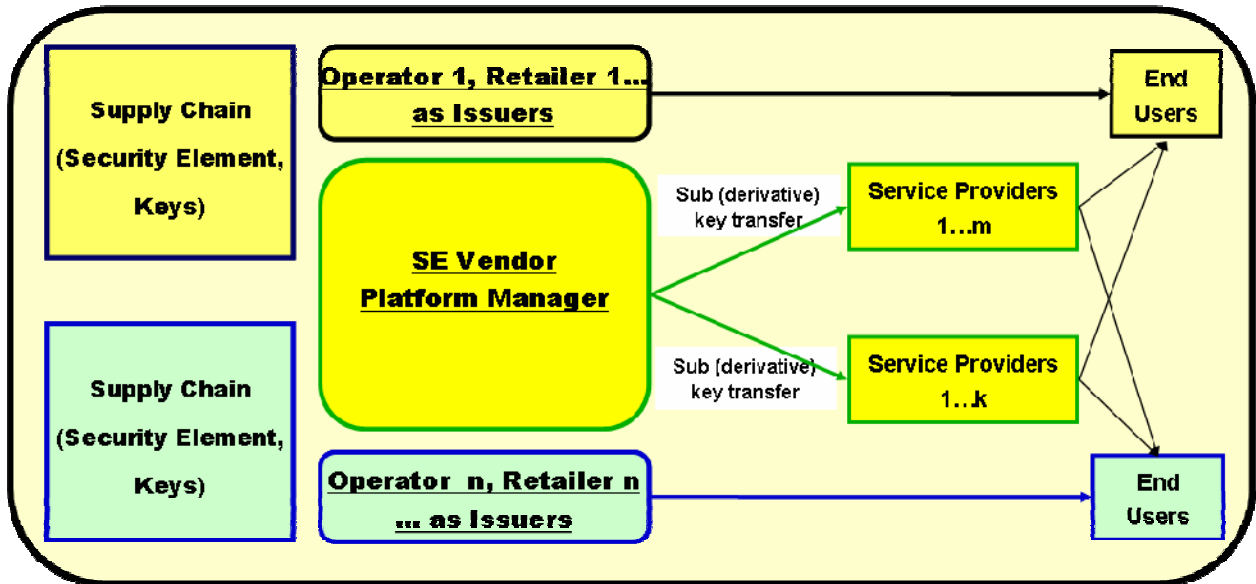
Figure 6. A Neutral Trusted Third Party as Platform Manager

An embedded chip might be the most suitable SE in this scenario, but a neutral third party can also manage (U)SIM and SMC Platforms. However, it seems unlikely that most operators, in the foreseeable future, would allow a third party to take over the platform management operation of the (U)SIM. SMCs sold through independent retailers, which would fit into this scenario very well. All these issues impact on the issuing part of the business model and consequently on the business case of the SE Issuer.

This scenario allows banks, operators and other service providers to work with multiple business models and to cooperate and/or compete on service-price packages. At the same time, this model assures that the technical platform and policies of the SE are not allowed to fragment the market, and competition is focused at the SE Issuer and service provisioning layers.

In an optimal ecosystem, each service provider needs to make an agreement with just one or few centralized Platform Managers in order to have its application uploaded to the issued SEs. The Platform Manager ensures that SEs are technically compatible with each other. Consumers have access to all available services and they can switch on or off any specific service that they choose.

In Japan, the Felica solution fits Scenario 3. Felica Networks acts as a centralized Platform Manager whereas operators act as SE Issuers. In the Felica concept, a mobile device is fitted with an embedded chip that is issued by mobile operators to end-users.

4 Conclusions

To sum up, the contributions of the Mobey Forum Mobile Financial Services Business Ecosystem Analysis are as follows:

- *Providing* a concrete definition for "Mobile Financial Services Business Ecosystem"

- *Formulating* a conceptual business ecosystem framework

- *Identifying* the two critical roles in the business ecosystem which shape the scenarios, namely "Platform Manager" and "Security Element Issuer"

- *Describing* the roles of key stakeholders in different ecosystem scenarios

- *Evaluating* the feasibility of each ecosystem scenario

- *Underlying* the strategic consequences of each ecosystem scenario

4.1 *Three Security Elements were identified as having the highest potential for use both in proximity and in remote environments*

These are 1) (U)SIM, 2) SMC and 3) Embedded chip. (U)SIM is closely linked to operator-centric business ecosystems. SMC allows independent business processes for different players. Theoretically, anybody can become an SMC Issuer and the Platform Manager. The potential use of an embedded chip may put SE Vendors in the best position to become Platform Managers. In Japan for example, Felica Networks can be seen as Platform Manager whereas mobile operators issue proper handsets, including those with embedded Felica chips.

From the usability perspective, (U)SIM and SMC offer the end user higher value because the user is able to transfer these from one mobile device to another. When it comes to an embedded chip as the SE, easy processes are required in order to re-register all services when the end user changes the mobile handset.

4.2 *The described scenarios cover potential ecosystems for international, national and niche markets*

Mobey Forum sees that the three main scenarios cover different market needs and they can potentially cover market scopes of different sizes. Choice of the preferred ecosystem depends on the targeted market scope (niche, national or international) as well as on inter-sector relations, particularly between the financial and telecom sectors.

The highest international potential lies within the scenario where global personalization bureaus take the role of Platform Manager. The SE may be an embedded chip or SMC sold through independent retailers. A SIM is also a possible SE, if mobile operators allow third parties into the management process. A

strong drive is required from personalization bureaus and support from mobile device manufacturers in order for the scenario to become a reality.

National solutions can be based on the scenario where operators act both as (U)SIM Issuers and as Platform Managers. The scenario may take place in markets where the key players (operators, banks and public transit companies) have good relations of trust and where business models can be found. This kind of business ecosystem becomes more complex as the market scope expands. As the number of Platform Managers (in this case mobile operators) per market increases, the market become increasingly more fragmented, making it very complex for service providers to sign multiple one-to-one agreements with each Platform Manager in order to reach the full market. Operators are the key drivers in this scenario. It is critical that there is agreement between the mobile operators on common SE implementation in order to make market entry technically as easy as possible for service providers. Banks and public transit companies should also be involved in national ecosystem and infrastructure design in order to assure interoperability and sufficient security level, and to guarantee support from the key players. A decentralized operator-controlled (SIM as SE) business ecosystem is well suited in markets where banks and other large service providers aim for national solutions and where they have existing cooperation with the telecom sector. However, for multi-national banks and services providers, which do not often have bank-telecom cooperation in all national markets, the one-to-one dependence on the mobile operator to reach customers in each national market can be quite complex.

The niche solution can be based on banks or other service providers acting as Platform Managers and using Secure Memory Cards as Security Elements. Banks that want to launch mobile proximity payments in full independence of any third party may support this scenario. The market place becomes more complex for other service providers the more there are SE Issuers, thus leading to market fragmentation. The challenges in the business case for using the relatively expensive SMCs have to be managed i.e. do banks or end users carry the cost. Such solutions are likely to attract certain niche segments but they are unlikely to become mass-market solutions.

4.3 *Recommendations for the key stakeholders*

Mobey Forum recommends that SE Vendors evaluate the business proposition of possibly acting jointly as Platform Manager for the financial, telecom and service provider communities. The technically intensive part of the Platform Manager may especially well suit SE Vendors because they have the technological competence, foresight for the future of SEs and trusted business relations with the financial (on credit and debit cards) and telecom sectors (SIM). Allowing the technically intensive and commercially viable role of Platform Manager to a trusted player in the MFS chain allows operators, financial institutions and merchants to capture new customers through SE issuance and value added services.

Mobey Forum encourages the key players (banks, operators and other service providers) in the national markets to launch joint studies to compare, evaluate and identify the potential and preferred business ecosystem alternatives and implementation architectures for their markets. The purpose of this document is to provide a sound overall starting point for such national discussions and to bring strategic value to this work.

Banks should analyze the role of mobile device as a form factor for contactless payments when creating a contactless payment strategy. Several differences have to be taken into account, but there are also opportunities that do not exist with the other form factors such as plastic cards and key fobs. Banks should also consider the use of mobile device as an authentication token in their remote service, such as netbank.

Mobile operators should analyze the different business opportunities and prefer the ones that allow fast market growth and open business models. In the Felica business model in Japan, the space in the embedded SE (Felica chip) is divided into common and free areas. The SE Vendor (Felica Network) controls the common area for applications that require high security, and mobile operators control the free area for applications with lower security requirements. This gives operators new business opportunities and it is expected to reduce the churn rate as the value of the mobile operator's services increases. A similar approach may be taken in other markets.

Mobile terminal manufacturers should enable different technologies and let the markets decide on the winning solutions and preferred ecosystems. Mobile device manufacturers play the key role in determining the kinds of business ecosystems to be enabled because the type of SE has such a strong influence on the preferred business ecosystem. It is expected that one device type will support only one kind of SE.

Credit card organizations should establish standards for contactless payments and certification policies and take into account the especial characteristics of mobile devices as the form factor. Establishing contactless EMV specifications is a necessary step in order to move towards mobile proximity payments in markets where banks are committed to the EMV roadmap.