Mobile Payments and NFC
Latest trends

Guillermo Escofet
Senior Analyst, Mobile Content & Applications
Informa Telecoms & Media

Mobile NFC payments update

Getting nowhere fast …

- NFC has been **overshadowed by "cloud-based"** mobile payment **services**:
  - Starbucks' bar-code- and cloud-based payments have been a runaway success (10% of all purchases at its US stores done via its mobile app, amounting to 4 million transactions per week).
  - Online players such as PayPal, which is experimenting with numerous alternatives to enable in-store payments, including BLE beacons, photo ID and in-app check-ins/bill ordering, have shown plenty of inventiveness and energy.

- The **use case** and **business case** for mobile NFC payments remain **unproven**. There have not yet been any true success stories:
  - In Japan, by far the best-deployed country in terms of mobile contactless payments, DoCoMo has 20 million subscribers signed up to its Felica mobile wallet but generates only 20 million transactions a month (one per user!).
  - Google Wallet did not take off as a pure NFC product. Google relaunched it as a cloud product last year and decoupled it from NFC phones in September. It is now betting on "host-based card emulation."
  - Early operator NFC-wallet deployments in the West have also failed to take off:
    - Turkcell, which launched a payments-focused NFC m-wallet three years ago, got "no adoption." It has now relaunched with the focus on offers and loyalty points and offering NFC payment alternatives, such as "pay by phone number" and "pay by car registration number"
    - Orange, which launched QuickTap in 2011, also got nowhere. Now EE has launched a similar product, Cash on Tap.
  - Operator NFC consortiums, such as Isis and Weve, have been slow to roll out. Isis has lost one partner (Capital One) after lackluster pilot results. Weve is prioritizing deals over payments and will start with bar codes.

- Still **no NFC iPhone** – a big factor in undermining faith in mobile NFC, especially among retailers. Apple seems to be betting on BLE instead.

Mobile NFC payments update

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But momentum is still there …

- There is big momentum behind the rollout of NFC:
  - NFC payment terminals are becoming more widespread, though still the exception rather than the rule.
  - NFC payment cards have become commonplace.
  - NFC mobile devices are also much more widespread. There are about 200 of them (including tablets and PDAs) out in the market, and 15 others are in the pipeline. About 170 are enabled for payments – mostly via SWP (single-wire protocol).
- Mobile-NFC-service-rollout announcements continue:
  - China Telecom launches E-Surfing mobile wallet, in cooperation with more than 10 banks in China.
  - Vodafone launches its SmartPass wallet in Spain and Germany. The Netherlands, the UK and Italy will follow in the spring.
  - Telenor and DNB bank announce the rollout of a nationwide mobile NFC payments service, Tap2Pay, in Norway.
  - Rogers in Canada obtained a banking license this year and is gearing up to issue its own NFC credit cards in 2014. A mobile version will follow.
  - Orange France and Visa Europe are gearing up to roll out Orange Cash in two cities in early 2014.
  - 3 and Citibank in Hong Kong launch 3 Citi Wallet, enabling payments and offers.
  - Etisalat and Du launch NFC SIM cards to enable mobile payments on public transportation in UAE, as either a flat fee (Du) or a combination of SIM-purchase, activation and monthly rental fees.
  - Sprint launches Pinsight Touch, an open platform to enable businesses to add NFC capabilities to their mobile apps and securely store user credentials on handsets for payments and access controls.

The problem is that …

- Mobile NFC payments are too complex to roll out and involve too many different partners.
- Some technical elements are still missing. For example, there are no NFC standards for coupon redemption.
- Operators are not naturally good at cooperating with each other.
- Operators are unwilling to take much of an upfront risk and are taking a slow, step-by-step approach.

Mobile NFC payments update

Is NFC moving to the cloud?

- Much of the debate around mobile payments over the past two years has been framed in the context of NFC vs. the cloud. But recently the idea of **cloud-based NFC** payments has **gained ground**:
  - Google has built support for Host Card Emulation (HCE) into its new Android operating system, Kit-Kat, launched this month. Its last two Nexus devices reportedly did not come equipped with embedded secure elements (eSEs). So Google seems to be betting on HCE to enable authentication on all Android NFC phones.
  - In February, Spanish bank Bankinter unveiled a mobile-NFC-payments service (together with Visa) that won't make use of a physical secure element (SE) within the phone or phone peripherals. Instead, it will rely on two-factor authentication and virtualization.
- **Drivers** for HCE:
  - It provides service providers (e.g. banks) with a way of bypassing operators and handset makers/OTTs for payment authorization – no SE-space rental fees, no handing over control to other parties.
  - For Google, it's a way of bypassing the operators' blocking tactics, which have severely limited the distribution of Google NFC phones with embedded SEs.
- HCE **pros**:
  - No storage limits.
  - Device-agnostic.
  - Cheaper (no hardware costs, simpler to provision).
  - Could break logjam blocking SE-based NFC rollouts.
- HCE **cons**:
  - It requires the phone to be connected.
  - Not yet compatible with Mifare Classic, proprietary systems such as Felica.
  - Not yet certified by Visa, MasterCard.
  - How secure is it, really?
- What about the **Trusted Execution Environment**?
  - Another alternative to SEs, for apps with low-to-midrange security (e.g. loyalty cards, DRM, corporate security).
  - Could work in conjunction with HCE to add an extra layer of security for payments.

New use cases for secure NFC

Recent announcements by technology companies propose new ways in which online payments and other transactions can be secured by combining NFC cards with NFC devices:

- **Enabling NFC payments on PCs:** NXP Semiconductors has launched an NFC chipset for PCs that is being integrated into Intel's fourth-generation core processors and platform with Intel's Identity Protection technology. Users will be able make online payments by simply tapping an NFC card or phone against the PC's built-in NFC reader. The service is initially limited to MasterCard payments.

- **Enabling two-factor authentication for handsets:** IBM has developed a two-factor authentication system for securing transactions on NFC-enabled mobile devices in combination with contactless smart cards. Users hold their smart card next to the NFC reader on the mobile device, and after they key in their PIN, a one-time code is generated by the card and sent to the server by the mobile device. Potential uses: online banking, control of access to corporate systems, etc.

- Windows 8 OS incorporates support for NFC.

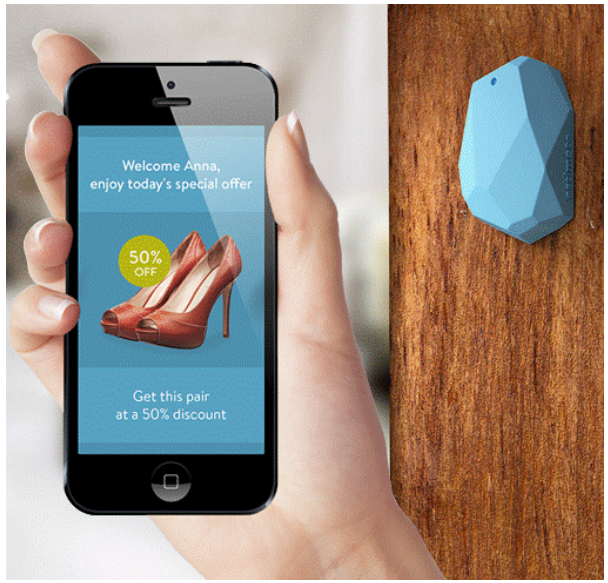
Beyond NFC

Bluetooth Low Energy

- BLE has suddenly emerged as a compelling alternative to NFC. Both PayPal and Apple are betting on it:
  - In September, PayPal unveiled Beacon, which uses BLE connectivity between phones and in-store transmitters to automatically “check in” shoppers as they walk in and enables them to pay at the register by just showing their face and never having to take out their phone or card.
  - Apple “half”-unveiled iBeacon at the launch of iOS 7. It has started trialing it in conjunction with BLE beacons (supplied by Shopkick) at Macy’s stores for offers/recommendations. Now that it has acquired PrimeSense, it could use iBeacon in conjunction with kinetic technology to analyze shopping behavior.

- Pros:
  - Enables a truer “contactless” payments experience than NFC.
  - It adds an offline-, local-connectivity dimension to cloud-based services (i.e. phones do not need to be connected to the cloud).
  - BLE is an open-standard technology that has been inside most smartphones for over two years (for Apple, dating to the IPhone 4S).
- Cons:
  - Like NFC, it requires special hardware to be present in stores.
  - For payment offerings such as PayPal’s, the BLE software needs to be integrated into POS infrastructure.

- PayPal says it will start piloting Beacon-enabled shopping experiences in 4Q13, and the full rollout is planned for early next year.

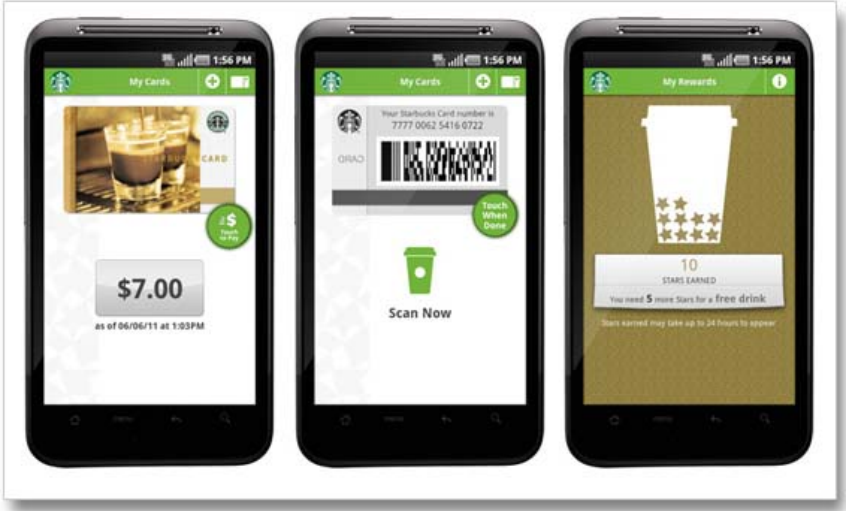


Beyond NFC

QR codes

- They are the most widely used mechanism for cloud-based mobile payment services, including the most successful of all, the Starbucks Card Mobile App. But Starbucks' success is unique. Much of the apps adoption could be due to the personal touch of Starbucks' baristas.

- Bar codes can be seen as a stopgap until less clunky alternatives become practicable.
- US merchant consortium MCX (including WalMart, Target, Best Buy, 7-Eleven and Shell) will be rolling out mobile payments using bar codes but hasn't ruled out using NFC at a later date.
- Samsung is juggling both NFC and bar codes, incorporating Mobeam into its phones to enable legacy POS scanners to scan bar codes on mobile screens.
- Pros:
  - Compatible with all smartphones.
  - Cheap to produce.
  - Work in offline mode.
- Cons:
  - Require compatible POS scanners.
  - Relatively clunky.



MCX MERCHANT CUSTOMER EXCHANGE

Beyond NFC

In-store check-ins, photo ID, etc.

- The idea was borrowed from social location apps such as Foursquare, where users open up their PayPal app as they walk into a store to “check in” (or check-in happens automatically via GPS or BLE). The user’s photo and name come up on the store’s POS screens. The user goes up to the register and pays without needing to get out his phone or card.
- Check-in can be used in the context of a restaurant. Bill can be “brought” via the app, without requiring the waiter to do it, and paid via the app too.

Mobile number as a proxy

- System whereby the user keys in either his own number or someone else’s to enact a payment. The user keys in his own number when making a payment at a POS terminal, for example (that is normally accompanied by a notification sent to your phone, which asks you to key in a PIN – e.g. Turkcell). Or he keys in someone else’s number, when making a P2P payment, as in the case of Pingit, where the user just keys in a friend’s number in the app to make a transfer.
- UK banking association the Payments Council is building up a comprehensive database of all UK bank-account holders and their corresponding mobile numbers.
- A similar proxy can be done with, say, car registration numbers, as in Turkcell’s example, where the gas-station POS operator keys in the car number to start payment without requiring the driver to leave the car.

NFC alternatives beyond payments

- IOS app Knock uses BLE to enable users to unlock their Mac desktop or laptop by just tapping their fist on their iPhone, as they would when knocking on a door.
- IOS app Airlike enables users to “flick” content from their phone to another, using the phone’s GPS and gyroscope in combination with cloud-based algorithms to remotely connect devices.

Who is leading deployments?

Merchant-led	• Starbucks • MCX (US)
Bank-led	•Barclays Pingit (UK) •Payments Council (UK)
Telco-led	•DoCoMo (Japan) •SKT (South Korea)
Telco consortium	•ISIS (US) •Weve (UK) •Many others
Telco/bank consortium	•Orange, Zachodni WBK (Poland) •Telenor, DNB (Norway)
OTT-led	•Google •PayPal
Device-led	•Apple •Samsung

Operator-led deployments

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These are the most numerous. They are characterized by the following:

- **Focus on prepaid money** (for NFC, security, low-credit-risk, regulatory, revenue reasons).
- **Partnerships with either MasterCard or Visa**, to:
  - Piggyback on the global NFC-payment networks enabled by the two payment giants.
  - Extend payment/ATM options for closed-loop mobile money services in emerging markets.
- In **developed markets**, heavy **emphasis on NFC and POS payments** …

  … and increasing emphasis on related mobile-retail services, such as offers, price comparisons, loyalty points and vouchers.
- In **emerging markets, emphasis on money transfers**, mobile top-up and utility-bill payments.
- **Digital wallets** are often issued with a companion plastic card, to:
  - Make payments at non-NFC points of sale or exceed the NFC-transaction-value limit.
  - Use at ATMs
- **Big push behind SIM-authenticated payments**, in the case of NFC ...

  … when not NFC, deployments are cloud-based.
- Some operators have acquired their way to an e-money license (e.g. Deutsche Telekom) or are applying for one (e.g. O2 Telefonica) …

  … but most are forced to team up with an e-money-license holder (e.g. bank or e-money startup).
- **Revenue model:**
  - Largely focused on SIM-space rental model …
  - … or transactional fees, if e-money licensee or in “unbanked”/emerging-market scenario.

Other players

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Merchant-led

- Merchant consortiums such as MCX are rare.
- Merchants are looking to bring their brand to the fore; enter into a direct relationship with customers; and reduce transaction fees by cutting out other parties and encouraging shoppers to pay via merchant prepaid accounts.

Device-led

- Handset makers (e.g. Samsung, Apple) look to take control and universally enable their developer community with the service in question. The same goes for OS provider Google.
- This year Samsung revealed plans to roll out its own mobile commerce services on its own devices, admitting that it's been embedding its own SEs in its NFC handsets and supporting SWP (single-wire protocol). It has signed a global deal with Visa.

Bank-led

- Banks are looking to bypass operators and device makers in their delivery of mobile payments.
- Barclays' Pingit P2P payments app has been downloaded by 2 million UK bank-account holders (13% non-Barclays). But it's not generating that much traffic. "You don't need to pay friends that often," the bank said. Barclays is not making money from it. It's more of a customer-retention/-acquisition tool. The bank is now trying to extend the app to online payments.

Cash on Tap follows in Quick Tap's footsteps with NFC-focused wallet

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Main facts

- Cash on Tap: new mobile-NFC-payments service recently launched by EE in the UK in partnership with MasterCard (very similar to Quick Tap, launched by EE partner Orange in May 2011, in partnership with Barclaycard).
- Initially limited to three NFC Android smartphones (Samsung Galaxy S4, Galaxy S3 LTE, Sony Xperia SP).
- Compatible with MasterCard PayPass-enabled terminals at 230,000 outlets in the UK.
- Focused on only payments first but will eventually extend to other services, such as ticketing, loyalty cards, etc.
- Not preinstalled. Available as an Android app (EE Tap Wallet) on Google Play.
- £10 credit given as a sign-up incentive.

Thinking / business model

- EE is following Orange's one-track focus on NFC (e.g. all EE NFC handsets are now sold with NFC-enabled SIM cards).
- It sees localized transactions on phones as giving it a key authentication role, via SIM-based secure elements.
- It believes it can make revenue from SIM-space rental fees (for now, independently from Weve joint venture),
- Marketing message: "Convenient way to pay. It still works even if phone is switched off."
- But experience with Quick Tap is not promising: Take-up is poor. What is just too early to market?

Cash on Tap: new 4G offering

EE

MasterCard

Quick Tap: old Orange offering

orange™

barclaycard

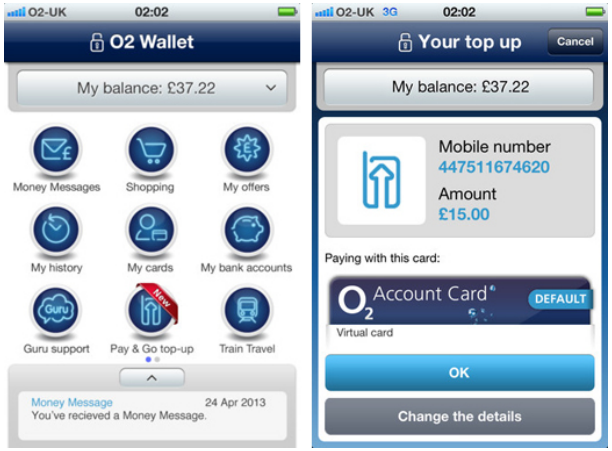
O2 Wallet places initial focus on P2P payments, not NFC

Main features

- Money Messages: Make simple P2P payments by just keying in recipient's phone number.
- Shopping: Search for products and compare prices among more than 100 retailers.
- My Offers: Get discounts from more than 100 retailers.
- Train Travel: Look up train times and pay for tickets.
- My Cards: Link wallet to up to four credit/debit cards, plus O2 Money prepaid card.
- Account data stored in the cloud/OTT offering (i.e. not just available to O2 subscribers).
- Not enabled for NFC/POS payments yet.
- Comes with companion O2 Money prepaid card (which *is* NFC enabled).

Thinking / business model

- NFC is not be-all and end-all.
- Compelling enough to have wallet enabled for just online and P2P payments, combined with price-comparison and offers.
- Partners: IDT Financial Services (e-money licensee/O2 Money card issuer), Visa, Wave Crest, FIS, Intelligent Environments.
- Potential revenue:
  - Revenue-share from redeemed offers.
  - Click-through/sales-commission payments from price comparison.
- Main declared business model: Customer retention.



Isis Mobile Wallet: Slow to roll out; faces a lot of local competition

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Main features

- Joint venture of AT&T, T-Mobile and Verizon.
- Just rolled out nationwide, following pilot phase in two cities: Austin, Salt Lake City (around 1,600 stores).
- Compatible card-payment services: American Express, Chase (CapitalOne withdrew).
- Focused on SIM-based NFC payments; also integrated with offers/ loyalty points from some merchants.
- Average Isis customer uses the wallet five times a week.
- Main rivals:
  - Google Wallet: available nationwide, via more retailers, but on fewer handsets and via fewer handset distributors.
  - Merchant Customer Exchange: cloud-based wallet due to be rolled out by a JV of big US retailers.
  - Starbucks: 10% of its US transactions (about 4 million a week) are mobile.

Thinking / business model

- Originally planned to deploy its own POS payment network, in competition with Visa and MasterCard, but gave up because:
  - Signing up merchants was too difficult.
  - Legislation lowering interchange fees weakened business case.
- Revenue model: SIM-space-rental fees; fees for delivering merchant offers/ coupons.

at&t

MyWallet rolls out in Poland; has potential to earn T-Mobile transactional revenue

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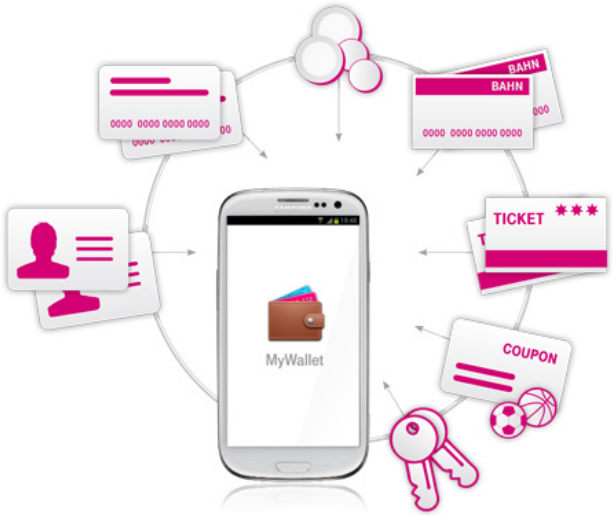
Main facts

- MyWallet: Follows global deal signed between Deutsche Telekom and MasterCard.
- First rolled out in Poland (Oct. 12); being trialed in Germany; Europewide deployment planned.
- By March, MyWallet had 10,000 sign-ups in Poland.
- T-Mobile Poland is:
  - Focusing on SIM-based NFC payments.
  - Making the service available only to postpaid subscribers.
  - Starting to preinstall the wallet in some handsets (three so far).
  - Planning to extend service to transit/event ticketing, loyalty programs, ID cards.
  - Making app downloadable via SMS shortcode.
- So far, credit/debit cards from four affiliated Polish banks (including a T-Mobile-branded credit card issued by Raiffeisen Polbank) can be loaded onto wallet.
- Partners: Trevica (MasterCard owned), bank TSM; Morpho Cassis (via MasterCard), service provider TSM; Toro, m-wallet-software developer; Gemalto, NFC-SIM supplier.



Thinking / business model

- Poland chosen as launch market because of its high penetration of NFC POS terminals (a third are NFC enabled).
- DT has an e-money license through its acqusition of ClickandBuy, so it can roll out m-wallets without teaming up with a bank.
- License allows it to earn transaction-fee revenue, as well as SIM-space-rental-fee revenue.

Moneta: Slovenian operator builds payments network of its own

Main features

- Slovenian cross-carrier mobile payments system, with 200,000 unique users (10% of population).
- Created its own payments network, playing the role of both issuer and acquirer:
  - Controls 15% of Slovenian POS terminals.
  - Payment option on 70% of Slovenian websites and 10% of vending machines.
  - Accessible to 85% of Slovenian mobile users (launched by No. 1 cellco Mobitel and joined by No. 2 cellco Simobil).
- Initially only offered online payments; started rolling out Moneta POS and vending machines in 2002.
- Later rolled out ePOS software to be installed in legacy POS devices; now also relying on m-POS software for smartphones and tablets.
- Mobitel teams up with Nova KBM bank in 2003 to turn Moneta into a multi-account, multi-issuer system.

Thinking/business model

- Mobitel has secured itself a share of transactional revenue by playing the roles of issuer, acquirer and payments processor.
- Moneta has been technology-agnostic, using different technologies at different stages of its evolution (e.g. it is not using NFC for now but is open to the idea of doing so in the future).

www.moneta.si

Conclusions and recommendations

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General

- There will initially be several competing approaches to enabling mobile payments, employing different technologies and enabling different shopping experiences.
- Just emulating card payments at POS terminals provides no additional value.
- In the long run, the approaches – or approach – that end up dominating will be those that provide the easiest and most universal route to market for OTTs and a shopping experience that adds significant value over and above paying by cash or cards.
- Rollouts should not be focused on payments only. They should include activities leading to/ surrounding payments, such as offers, loyalty points, price comparison, store finder, etc. In fact, maybe the rollout of payments should follow that of these other activities (just like Weve intends to do, and as SKT has done with its Smart Wallet and KT has done with its loyalty-focused MoCa wallet).
- Rollouts should not be focused on just NFC either. They should be made as technology agnostic as possible, including QR codes, phone-number-based authentication, store check-in/photo-ID, etc.

For operators

- MNO mobile payments (excluding carrier billing) still represents a nascent market, with little in the way of any established best practice.
- The role for operators in mobile payments is still unclear. Less clear still is their business model.
- Without buying their way into the payments value chain, or building their own payments network, MNOs cannot hope to gain a share of transaction fees – unless they impose surcharges (or foreign-exchange transactions are involved).

Conclusions and recommendations

For operators (cont.)

- MNOs must make m-wallets cross-network, by either teaming up with all other operators in a given country/territory (which is slow and difficult) or by launching the wallet as an OTT product (a much easier route). By making a wallet accessible to all mobile users within a country, MNOs maximize their ability to gain traction among merchants and users.
- In connection to the above point, MNOs should consider making wallets cloud-based, rather than SIM-based. They would lose the potential of earning SIM-space-rental revenue, but they would maximize their chances of user take-up and of earning revenue on the other services beyond payments.
- MNOs should also try to focus m-wallet adoption on pain points such as transportation ticketing (e.g. poster next to train-ticket queue saying, “Download this wallet app from X carrier and buy your ticket without having to wait in line”).
- SIM-based NFC payments are established as a global standard and are the focus of most deployments. But they have several drawbacks that threaten their long-term sustainability:
  - They are network-centric and therefore fragmentary.
  - They were ultimately designed to serve operator interests rather than what the market most needed.
  - They are the worst approach for catering to global developer communities.
  - They have storage limitations and are complex to provision.
- Their greatest chance of success will be with more-country-specific services tied to national payment initiatives, public transportation systems, local regulatory systems, etc.
- The issue of fragmentation could be alleviated if TSMs such as Gemalto and G&D start aggregating connections to operator NFC SIMs.

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