The State of Pay

A mobile revolution

semble.co.nz

Overview

The introduction of the mobile wallet represents the most significant evolution in payments for New Zealand since the Eftpos card launched in 1984. As mobile payments continue to develop, evolve and hit headlines around the globe, it is becoming clear that mobile payments and associated services are reaching a tipping point; from emergent to commonplace.

Driving this evolution is the relationship between people and their mobiles. Far beyond calls and messaging, people now expect their mobile to act as a remote control for life; for watching, browsing, banking, shopping, sharing, filming, scheduling and so much more. As both contactless transactions and mobile banking continue to grow at an exponential rate, it's unsurprising that consumers now want their mobile device to do so much more. With new technology, it can now replace physical bank cards in the same way a mobile has already replaced the need for a watch or a camera.

At the user experience end of this revolution, the world is a simpler, easier, more convenient place, but the journey there is far from simple. Understanding what each mobile payment platform can deliver, how they're intended to work globally, and importantly, the impact for New Zealand, is challenging — even for those in the mobile payments industry, let alone for the public.

The purpose of this document is to provide a summary of each of the mobile payment offerings currently in market or in development and what this means for New Zealanders. This includes Semble, Apple Pay, Android Pay and Samsung Pay.

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The makings of a mobile wallet	Mobiles	Security	Connectivity	Services	Availability	Customers
						
	Access to enough mobiles to drive the behavioural change from physical cards to digital versions inside mobiles	**A safe, secure, globally recognised way to store customer credentials**	**A common language for the phone to "talk" to the acceptance device (terminal, POS reader etc)**	**Multiple services available to use that emulate how we use our physical wallets today — payments, transport, loyalty, offers & more**	**Current market availability with potential for growth**	**Customers ready and willing to trust, accept and use the services everyday**
Pay	iPhone 6 (upwards) Requires iOS 8.1 or newer	eSE physical (hardware)	NFC	US — Payment + Loyalty UK — Payment + Transport	Currently US & UK with other markets on the way	Launched with customer uptake growing
pay	NFC Android devices OS 4.4 & above	HCE (cloud)	NFC	Payments only	Currently US only	Launched with customer uptake growing
SAMSUNG pay	Samsung S6 (upwards) with NFC capability	eSE	NFC / Magstripe	Payments only	Currently Korea & US with UK, Spain & China on the way	Launched with customer uptake growing
SEMBLE	34 multi-branded NFC enabled Android devices, 1m+ eligible across NZ	SE physical (SIM)	NFC / Barcodes / QR codes	Payment + Transport (Loyalty + Offers on the way)	Launch in NZ — March 2015 for payment (ASB and BNZ), June 2015 for transport, with loyalty + offers to follow	Launched with customer uptake growing
Notes	Often requires collaboration with Mobile Network Operators, banks and loyalty schemes.	For payment, certification/ endorsement with global schemes is required.	Dependent on the ecosystem and technology in each individual market/country (e.g. EMV or magstripe).	Requires contracts and relationships with service providers and integration with multiple parties to make cards available in each wallet.	In these early days, no one wallet is currently available to everyone, everywhere.	End customer experience and perception needs to be simple and intuitive to drive uptake.

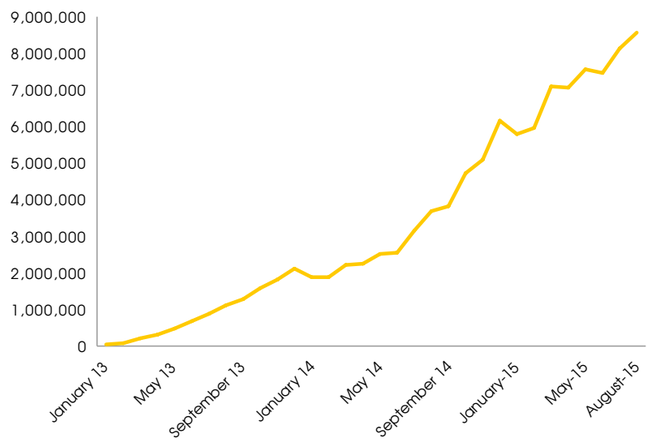
Refer to page 14 for a glossary of terms.

The local mobile wallet landscape

New Zealand has always been innovative in the payments space

1979 1st Scheme Debit card
1980 ATM Cards
1981 1st Scheme Credit card
1984 EFTPOS
2000 E-Commerce
2002 Multi-currency
2006 Chip & PIN
2011 Scheme Debit
2011 Mobile NFC Trials
2013 Contactless
2015 SEMBLE

Contactless payments are growing fast



21% of terminals enabled
15% of Point of Sale transactions
10% of Point of Sale spend
100% of Supermarkets now contactless
95% of Service Stations now contactless
80% of scheme cards now contactless

Source: Paymark and EFTPOS New Zealand

Smartphones are a big part of everyday life in NZ

77%

of New Zealanders own a smartphone. This has surpassed the worldwide average of 76% for the first time

91%

of New Zealand smartphone users reported they use their device every day

69%

of Kiwis with a smartphone use business or banking apps, up from 54% in 2013

59%

of NZ smartphone owners prefer to use it over other devices they own (laptop, tablet, PC or feature phone)

Sources: New Zealanders' Use of Smartphones and other Mobile Communication Devices Research New Zealand Report 2015, IDC Consumerscape 360: The Global Digital Customer

Kiwis are ready for the next step

Semble

Semble is a unique intra and cross industry collaboration between shareholders: 2degrees, Spark, Vodafone, Paymark & first service providers ASB, BNZ & Snapper. It is New Zealand's first mobile wallet.

In a global context the level of collaboration involved in the launch of Semble is unparalleled and has attracted significant interest internationally as a best practice model. Launched on March 31st 2015, Semble has a unique, localised platform for New Zealanders.

Initially offering payment services, with public transport coming on board 14 weeks later, and loyalty and offer categories soon to follow, Semble is now available to one million eligible Android users nationwide.

With the addition of a Semble Ready secure SIM, customers get Semble by downloading a free app on Google Play and by adding any of the 26 cards available in Semble. Users can then pay with their phones at contactless payment and Snapper terminals around the country.

Semble's technology is underpinned by a Trusted Service Manager (TSM) infrastructure, the main role of which is to enable a "virtual mobile marketplace" to help service providers securely distribute and manage contactless services for their customers using our local mobile operator networks. A major benefit is the accelerated scalability it offers the local market, the reduction in infrastructure costs for local businesses wanting to participate and the consistency of the services in market. By acting as an intermediary Semble is a single access point for Kiwi businesses to deliver compelling new mobile propositions to their end customers.

Semble launched using the Secure Element (SE) which resides in the phone SIM. The Semble Ready secure SIM provides support for Near Field Communication (NFC) contactless communication and introduces the Secure Element (SE) that stores encrypted personal information, to the same level as physical chip credit and debit cards. This is the most mature, secure and globally recognised technology with 67 live commercial services deployed around the world[1].

Key features of Semble:

— Seamless interaction with multiple dual-scheme (Visa and MasterCard) cards inside a single app, which supports our heavily multi-banked market place

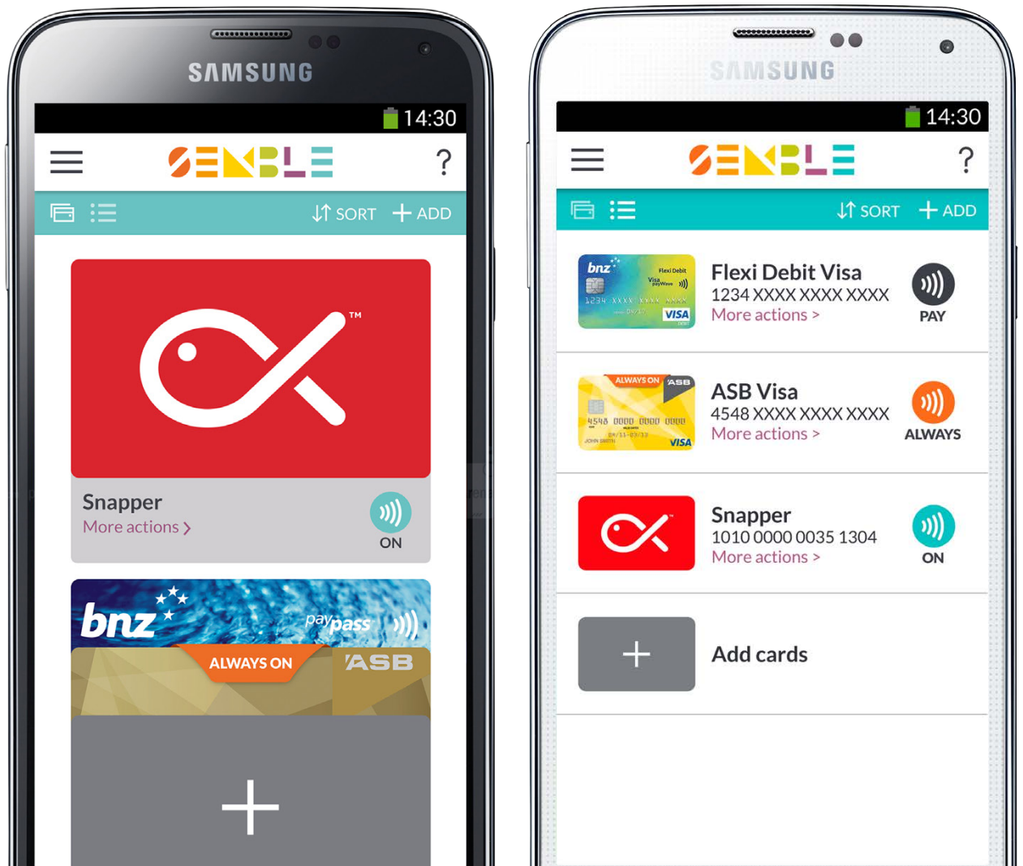
— Security — customers can choose to add additional layers of security over the physical wallet, with a 5 digit security code set by the user as well as using built-in smartphone security features such as a screen lock or fingerprint identification

— Always On — for those who value convenience, the Always On feature allows a customers to set a default card that will be used to pay every time, even when the phone is off

— Seamless interaction of services within the app — you can use your phone for payment and transport without even turning the phone on

Thousands of Kiwis are using Semble today to pay at contactless terminals around New Zealand as well as tagging on and off public transport with Snapper.

Soon New Zealanders will be able to store loyalty cards, collect & redeem points, get special offers and use gift cards all within Semble.



[1]GSMA, The New Mobile Payment Landscape, July 2015

The Semble Eco-system

3
Major Mobile Networks

2degrees

Spark

vodafone

Available on all 3 mobile networks with the addition of a Semble Ready SIM

26
Card options

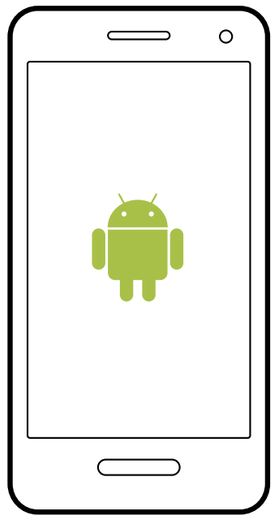
ASB

bnz Be good with money

SNAPPER

26 Visa and MasterCard credit and debit cards & Snapper card available to use in Semble today

1m+
Compatible Android phones



SAMSUNG

htc

LG

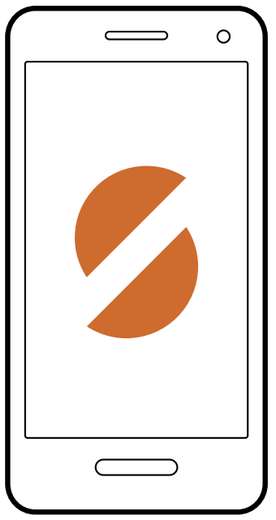
HUAWEI

SONY

ALCATEL onetouch

Direct relationships with all device manufacturers required to maintain and develop Semble

1
Mobile Marketplace



Pay

Go

Collect

Save

Gift

eftpos NEW ZEALAND LIMITED

payment express

Paymark

ingenico

ABnote Since 1795

VISA

smartpay payment solutions made easy

gemalto security to be free

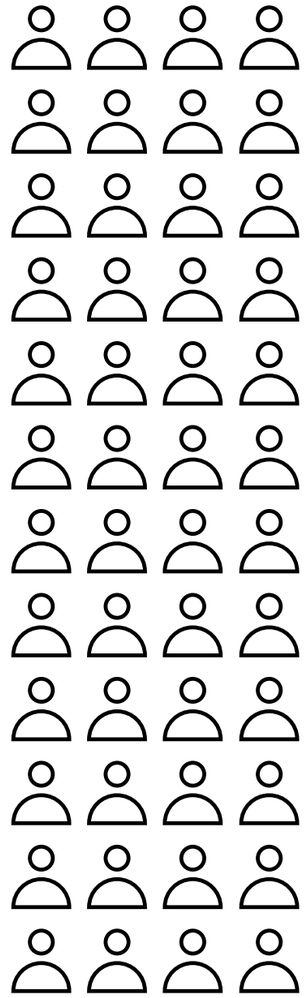
MasterCard

WolfStrike

Verifone

Payment and transport categories live in Semble today with more to follow soon

Huge
Customer potential across NZ



For Kiwi businesses and customers

Local observations from Semble

1. **Embedding a purpose built, localised solution has provided a layer of protection to preserve our local assets** before we reach a point of competition or collaboration with international solutions providers like Apple & Google.

2. **New Zealand does not need to wait for the international brands to arrive as Semble has the benefit of being the only solution live in our market today.** Test labs can only emulate the insights gained from real world users. Every day we learn something new about how customers are engaging with Semble and what they'd like to see next.

3. **Semble maintains that the sort of convenience and user experience offered by a single app with multiple services is the right approach in a country as small as New Zealand.** It allows us to expand accessibility to businesses, offer a mix of differentiated services beyond payment to customers and provide consistency of user experience where it counts.

4. **In the near term we expect to see the launch of mobile payment services locally from ANZ and Westpac.** Semble welcomes the competition and more activity in the mobile payment category and the incremental, cumulative consumer awareness and education that will build as a result.

5. **Semble is particularly interested in consumer response to a multiple app scenario** and what product features will be developed to circumvent some of the challenges for the large number of New Zealanders who are multi-banked.

6. **Tokenization will clearly play an increasing role in the mobile payment space** and Semble will be watching the progress of the Host Card Emulation (HCE) deployments and how they are received locally.

The global mobile wallet landscape

Apple Pay

Apple Pay entered the mobile payments race with much fanfare in September 2014, with their first Near Field Communication (NFC) enabled smartphones, the iPhone 6 and iPhone 6+.

Introduced after much media speculation, the iPhone payment ability is enabled via both Near Field Communication (NFC) and Secure Element (SE) technology which is stored in the device hardware, known as Embedded Secure Element (eSE). Apple Pay also uses tokenization. Rather than receiving a card number from the customer, the merchant receives only a device-specific token and a dynamic, one-time-use security code. The token is translated back into the customer's credit card number only when it reaches the payment network, meaning that only the consumer's bank and the payment network have seen the customer's card number during the transaction.[2] Apple Pay is a traditional physical Secure Element (SE) and trusted third party approach[1] and represents a critical endorsement of Near Field Communication (NFC) as the de facto global point of sale communication technology for mobile payment.

Apple Pay initially targeted the highly competitive but extremely fragmented US payment market. With players including Google, Paypal, Square and merchant syndicated offerings such as MCX/CurrentC (not yet launched) in the mix, along with a payments network still largely supported by Magstripe Technology and almost no deployment of Europay Mastercard Visa (EMV) Chip cards or contactless terminals, Apple Pay was faced with a challenging job of converting consumers to mobile payments. Apple Pay nonetheless represented an opportunity to skip past EMV Chip cards while providing a reason to drive the nationwide roll out of contactless terminals. Because they added this new value to the market Apple were able to negotiate a commercial return from banks.

In order for Apple Pay to work at terminals with payment cards, Apple negotiated with US banks and relationships were formed with a number of key retailers to provide contactless terminals for customers to use Apple Pay in their stores.

Despite numerous challenges Apple Pay is now available at more than 240 banks in the US.

Apple Pay will soon be supported by all major US credit card companies after Discover announced plans to join Visa, MasterCard and American Express in letting its cardholders add cards and make Near Field Communication (NFC) payments using the mobile payments service.

Apple Pay launched in the UK in July 2015. The significance of which is twofold. Firstly it has allowed Apple Pay to test the solution outside of its home US market. Secondly it automatically enabled Apple Pay to be used on London's public transport system, because the underlying technology of the London Underground & London buses supports contactless payment cards.

In October 2015 Apple also announced they will go live with Apple Pay in Australia and Canada by the end of the year and in Spain, Singapore and Hong Kong in 2016. American Express customers are expected to be the first to be able to use the service in the new countries.[3] Significantly, Apple had announced that it would add loyalty services in the US from September/October 2015 and has also renamed the Passbook to Wallet. With three mobile wallet categories now in the pipeline, Apple is demonstrating strong indications of capability that extends beyond mobile payments.

Two key points to note here are that:

1. Apple hasn't opened its Embedded Secure Element (eSE) or Near Field Communication (NFC) up to third parties. Maintaining control of one or more of the essential technology components required to enable payments and certain other services is likely to be maintained by Apple for the foreseeable future. This is one of the key differences between the Android and Apple approach to market.

2. As part of Apple's commercial model they take a percentage of transactions. Anecdotal feedback from multiple sources confirms that Apple is encountering resistance in some markets, especially with regards to their commercial proposition. There is also a wider concern that banks will be disintermediated by Apple over time if they choose to partner with them.

[1] GSMA, The New Mobile Payment Landscape, July 2015
[2] http://appleinsider.com/articles/14/10/20/how-apple-designed-apple-pay-to-avoid-the-pitfalls-of-traditional-payment-systems
[3] http://www.nfcworld.com/2015/10/27/339087/apple-pay-to-launch-in-australia-canada-spain-hong-kong-and-singapore/

Android Pay

Android Pay represents the first major deployment of Host Card Emulation (HCE) technology for mobile payment globally. The world is watching with interest.

Google announced their mobile payment framework, Android Pay, at the Mobile World Congress in March 2015 and launched in the US on August 10th at more than 1 million locations.[4] Android Pay will offer a set of APIs (Application Programming Interface) that will allow developers to add an Android Pay button to their app and banks to enable payments in their existing applications. This will facilitate in-app and in-store payments on Android devices with KitKat 4.4 and above.

With 70% of Android handsets globally incorporating Near Field Communication (NFC) and 50% supporting KitKat 4.4+, this represents major scale from the outset. Existing eligible customers will receive the app via a software update and new customers will download the app from the Play Store. The app is also pre-installed on new Near Field Communication (NFC)-enabled phones from wireless carriers AT&T Inc, T-Mobile US Inc and Verizon Communications Inc.[4]

Android Pay accepts American Express, Discover, MasterCard & Visa.

Android Pay leverages Host Card Emulation (HCE) technology as opposed to the physical Secure Element (SE) or the Embedded Secure Element (eSE). This is different from Apple, Samsung and Semble's current approach. With Host Card Emulation (HCE) still in its relative infancy as a basis for a mobile payment solution, the Android Pay launch is the first major deployment of the technology globally. The world will watch with interest.

A card issuer (e.g. bank) joins Android Pay via a scheme (as per Apple Pay) and is subject to commercial terms between Google and the card issuer.[1]

What is most notable about Android Pay is that Google did not exclude other Near Field Communication (NFC) solutions using Host Card Emulation (HCE) or Secure Element (SE) in Android. Card issuing banks continue to have the option to implement their own Host Card Emulation (HCE) solution outside of Android Pay. Due to the greater flexibility and open source nature of Android as a mobile operating system, Android Pay offers an alternative that can co-exist alongside other mobile payment options.

Android Pay is not just stopping with payment

For select retailers who have integrated their Point Of Sale (POS) systems with the Google loyalty scheme there is the potential to provide a single tap experience to pay and update/ redeem loyalty points at the same time.

Google recently announced that for Android Pay it will not be "clipping the ticket" on transactions in the US, instead the service will be offered free. Visa Inc. and MasterCard Inc., which operate the dominant payment networks, recently standardised their tokenization card-security service and made it free, preventing payments services from charging fees to issuers.

If the above plays out successfully in market, it will be an attractive proposition for banks and credit card companies in the US, however for the customer it may mean that Google will seek other ways to monetise their product. Whether this commercial model is also utilised in other markets outside the US remains to be seen.

[1] GSMA, The New Mobile Payment Landscape, July 2015
[4] www.reuters.com/article/2015/09/10/us-google-inc-android-pay-idUSKCN0RA23320150910

Samsung Pay

Samsung Pay's unique point of difference is that it delivers a solution for not only Near Field Communication (NFC) transactions but can also emulate a traditional card for use with older magstripe based payment terminals.

Samsung Pay was announced in March 2015 as a service launching in Korea and the US and is making its debut as a feature update on the new Samsung Galaxy S6, Galaxy S6 edge, Galaxy S6 edge+ and Galaxy Note 5. The Samsung wallet was retired on 30 June 2015 and Samsung Pay launched in South Korea in August 2015 reportedly seeing $30 million transactional volume in the first month.[5] Samsung Pay also launched in the US on 1 October 2015 and the company has recently announced plans to launch Samsung Pay in China, the timing of which has yet to be confirmed.

Following the same format as Apple, Samsung Pay leverages an Embedded Secure Element (eSE) on the device, again using a physical hardware based Secure Element (SE), similar to Semble. It is, however, an open platform and supports the co-existence of alternatives such as Android Pay, issuer based Host Card Emulation (HCE) solutions and SIM solutions amongst others.

As with Apple Pay and Android Pay, Samsung Pay uses tokenization which in addition to Near Field Communication (NFC) Point Of Sale (POS) payments also supports online, eCommerce transactions.

Although initially seen as a challenger to Apple Pay, Samsung Pay's unique point of difference is that it delivers a solution for not only Near Field Communication (NFC) transactions but can also emulate a traditional card for use with older magstripe based payment terminals. With the US confirmed as the second major market, Samsung Pay's offering supports the large portion of the country who have yet to transition to contactless terminals (only 10% penetration estimated in the US).

Samsung calls the system Magnetic Secure Transmission (MST), which is a way to enable a contactless transaction by emulating a regular magstripe card for Point Of Sale (POS) systems that don't have more modern hardware. It is based on technology the company acquired when it bought LoopPay earlier in 2015.

For contactless payments, the existing payment terminals require no change because like Apple Pay and Android Pay, the technology leverages EMV standards to process the transactions.

MasterCard and Visa have both partnered with Samsung Pay and Samsung says it's working with American Express, Bank of America, Citi, JPMorgan Chase, and US Bank as future additions. Due to the Magnetic Secure Transmission (MST) system, private label credit cards will also be able to get involved, with Synchrony Financial and First Data Corporation already on board and Samsung expecting more private label credit cards to join closer to launch.

At this stage there are no reported plans for Samsung Pay to launch in New Zealand, partly because Samsung's focus at this point in time remains on larger markets. Samsung continues to support and promote Semble in the New Zealand market.

[5] techcrunch.com/2015/09/28/samsung-pay-launches-in-the-u-s/

Global observations from Semble

1. **As mobile wallet solutions proliferate globally, there will be wins and losses.** Semble continues to actively build global relationships that allow us to watch, absorb, progress and continue to assess impact and relevance for us here in New Zealand.

2. **How and when Apple Pay, Samsung Pay and Android Pay appear in our local market remains to be seen.**

3. **Semble remains open to discussions with international players in the mobile payments industry about opportunities in New Zealand and opportunities to integrate with this market.** Co-ordinating with retailers, banks and loyalty schemes can be challenging, time consuming and expensive and Semble has already successfully established a framework for this to launch New Zealand's first mobile wallet.

4. **Host Card Emulation (HCE) and tokenization will undoubtedly play an increasing role in mobile payments moving forward,** however there are relatively few examples of Host Card Emulation (HCE) as a mobile payment enabler today. Semble continues to actively assess technology, ways to integrate the capability into Semble and appropriate timing to make that happen. Semble will continue to watch the global and local progress of Host Card Emulation (HCE) and tokenization with interest.

5. **With the proliferation of these technologies also comes opportunity.** Whether it be a local Apple Pay solution or leveraging the possibilities that Android Pay opens up with biometric authentication — there are a multitude of possibilities.

6. **While some of the world's biggest companies are ready to invest in mobile payments, it doesn't mean the customer is.** Mobile wallets are still very new to consumers and security concerns remain a priority. Understanding how people are going to feel about ceding control of their payments to Apple, Google or Samsung, remains interesting territory that Semble will monitor.

Key word reference

To understand the key components behind mobile wallet technology, it's important to understand the following terms.

Embedded Secure Element (eSE)
This is based on the same technology as Secure Element but is embedded in a mobile device rather than a SIM.

Europay Mastercard Visa (EMV)
The global standard for credit and debit payment cards based on chip card technology, taking its name from the card schemes Europay, MasterCard, and Visa — the original card schemes that developed it.

Host Card Emulation (HCE)
Host Card Emulation (HCE) is a cloud based alternative to Secure Element (SE). It is the term describing on-device technology that permits a phone to perform card emulation on a Near Field Communication (NFC)-enabled device without relying on access to a Secure Element (SE). Tokenization provides the security component with Host Card Emulation (HCE).

Magnetic Secure Transmission (MST)
Samsung's proprietary technology that emits a magnetic signal from a mobile device that mimics the magstripe on a traditional payment card. Magnetic Secure Transmission (MST) sends a magnetic signal from the device to the payment terminal's card reader.

Magstripe Technology
This is the technology used in Eftpos cards before the migration to chip cards and which is still used in some older card schemes. Cards are read by swiping past a magnetic reading head.

Mobile Payment
Refers to payment services operated under financial regulation and performed from or via a mobile device.

Mobile Wallet
The digital equivalent to the physical wallet. It is essentially a container (or an app) that allows storage of digitised version of the cards carried in a wallet today and likely includes a mix of card types; payments cards, loyalty cards, membership cards etc.

Near Field Communication (NFC)
Short-range wireless radio technology that provides a method of communication between two electronic devices, for example between a mobile phone and a payment terminal.

Operating System (OS)
The operating system on a mobile device e.g. iOS (Apple), Android or Windows Mobile.

Primary Account Number (PAN)
The 14, 15 or 16 digit number that appears on the primary account holder's credit or debit card.

Point of Sale (POS)
The time and place where a retail transaction is completed. It is the point at which a customer makes a payment to the merchant in exchange for goods or after provision of a service.

Secure Element (SE)
A tamper-resistant platform such as a SIM capable of securely hosting applications and their confidential and cryptographic data in accordance with the rules and security requirements set forth by a set of well-identified trusted authorities.

Tokenization
The process of replacing sensitive data with unique identification symbols that retain all the essential information about the data without compromising its security.

Trusted Service Manager (TSM)
A Trusted Service Manager (TSM) securely provisions and manages payment and other applications and data onto Secure Elements.[1]

[1]GSMA, The New Mobile Payment Landscape, July 2015

Conclusion

Ultimately consumers will determine which of the many mobile payment choices — available and forthcoming — will succeed.

For now, as the first and only mobile wallet in the New Zealand market, Semble will continue to use a market leading position to gain real world insights and to refine and improve the product, processes and customer experience. Removing friction, increasing the number of available phones, and the addition of multiple new service categories are all critical and remain the focus for Semble. Semble welcomes conversation with any company, globally or locally, that wants to become part of the New Zealand mobile marketplace. Semble is an innovation that was built on collaboration amongst competitors and we will continue to hold an open door to any organisation who wants to be part of this globally unique Kiwi innovation.