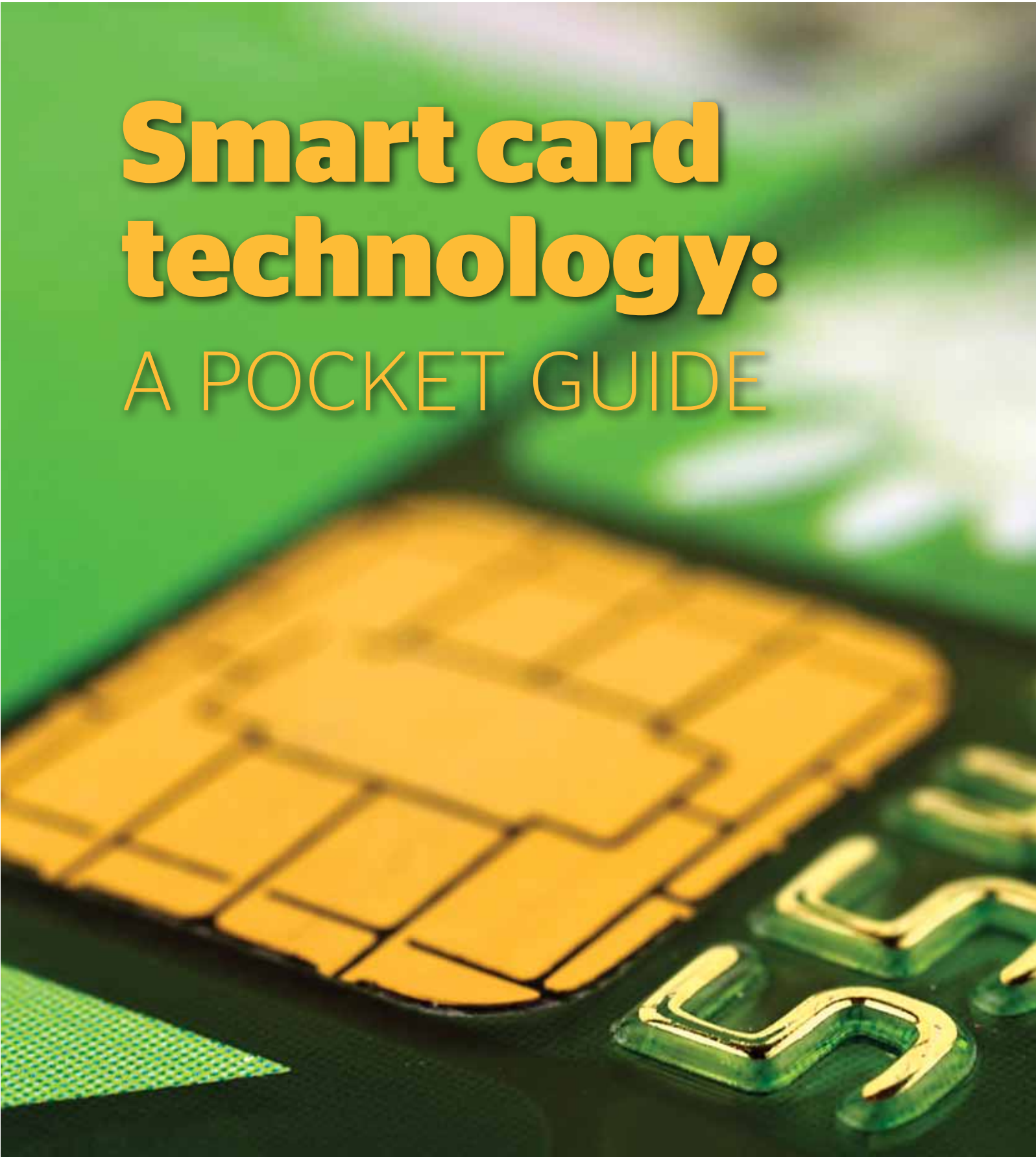# Smart card technology:
A POCKET GUIDE

When it comes to engaging with your customers, there's plenty to know in the realm of card technology. So if you don't know your ICC from your NFC, read on to find out just how smart cards, and the smart use of them, can serve your businesss...

If you're planning on using your EFTPOS card at any of the Rugby World Cup Games this year, you can forget it.

Rather, PayPass 'tap and go' cards will be the order of the day. The cards, able to be preloaded with up to $1000, and functional for individual transactions up to $80, will be the only option, aside from cash, on offer.

Predictably, there's been something of an online backlash against the plan, but what's the upside?

In a word, speed. PayPass won't require users to dip or swipe the card. Instead, they will simply tap the card against the card reader and the transaction will be complete, no PIN or lengthy transaction times required.

While customers may appear hesitant to embrace the new technology right out of the gate, the fact is that smart cards are gaining ground and fast.

So what's the difference between a regular EFTPOS-type card and its smart card, chip-enabled brethren?

A traditional EFTPOS card operates via a magnetic stripe on one side. This strip holds information magnetically (in the same fashion that the tape inside a cassette tape does), and is read, via a magnetised head, in the same way. It can hold a relatively limited amount of information and acts as, essentially, an identifier and little else.

Instead of having a magnetic stripe, however, a smart card has an embedded integrated circuit. That circuit can be used to store information, such as identification details, banking and loyalty programme data, and has application processing power. In some cases, they can operate within the proximity of reader devices, as will be the case at the Rugby World Cup.

The ability to process and encrypt data, not to mention store data and engage with application add-ons, make integrated circuit cards (ICC) extremely flexible compared to their somewhat crude magnetic stripe counterparts.

So, given the apparent advantages of smart card technology, and the fact that the technology has been available for years, why aren't we using them for everything?

In a word, cost. A strip card costs around 50c to produce, a smart card, closer to $5.

But it's not just about the cost of the cards themselves - it's the expensive upgrade of the support

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systems that accommodate the technology that's standing in the way of widespread adoption.

Without an upgrade to the networks currently being used, performance of smart card technology is poor. Rather than taking a reasonable five seconds to perform a transaction, as it does for an EFTPOS card on a standard dial-up terminal, a smart card can take up to forty seconds to complete a simple transaction on that same line, due to a heavier data load. If chip technology is to catch on for everyday purchases, a massive upgrade of terminals and infrastructure will be required.

"It's a colossal spend," says Simon Gamble, co-founder of Mako Networks, a network management company that specializes in security for payment card systems. "The banks don't want to have to replace every single card. Then they have to change all the terminals in all the stores, and then the back-end infrastructure that the banks and the payment processes have to change as well".

"So [the banks] are a little hesitant to do anything about it, but the bottom line is this is just where it's going."

The movement towards smart card ubiquity is well underway. But just what is the potential of the technology?

One company finding out is Snapper Services Limited.

Infratil, looking to replace a dated ticketing system for the Wellington bus services, and realising that a total hardware upgrade across all buses was probably inevitable, took inspiration from Hong Kong and Korea - both countries that had taken closed public transport ticketing systems and turned them into open payment systems that could be used across multiple industries. What followed was the creation of Snapper - a smartcard platform that can be used, not just in ticketing operations, but as a blank slate that can support developers and entrepreneurs.

The Snapper card contains a microcontroller running a Java operating system. The microcontroller is connected to an antenna that allows the card to both communicate and inductively draw power from readers within close proximity.

The Snapper card also contains a degree of 'free space', making it a sort of tabula rasa for those looking for a vehicle for their smartcard enterprises but needing an existing platform to do so.

"One of the things we've been very focused on is opening up the platform," says Miki Szikszai, CEO of Snapper.

"Most cards that are in use today globally are actually closed platform cards. The issuer basically locks them down and they are sort of hermetically sealed – you can't do anything else with the card. We've taken quite a different view where we've gone for Java-based technology which has open space available on that card.

"We are building [app developers' kits] at the moment.... We're making sure that if someone wants to write an application to the card, say, like a building access application, that they know how the card works and they know where the free space is, and it's set up to help them deal with that."

"There are a large number of corporates out there who are saying 'make it easy for me to manage these security and identity components', and there are people who have systems that allow them to do that, but the bit that they are missing is the token that helps them secure it all. That's what we can make this platform available for and they can go for it."

Similarly, there's no reason why out-dated event ticketing systems couldn't be replaced by a one size-fits-all smart card. Large events are increasingly exploiting smartcard technology, but are still limited by the closed system on which they operate.

"There is a Beervarna Festival, they've got their own card; it's the same with Rhythm and Vines, they have their own card that they use for that, which is fine, but what happens is that there's a whole lot of work that people have to do at the end. People are saying 'I've still got some value

left on this card, how do I get my refunds?' If however they were to use an open-platform card, they could say 'hey, I've got twenty bucks left on my card, I'm just going to spend it when I get home'."

An additional benefit of cards containing an integrated circuit is an increased level of security. By comparison, magnetic stripe cards are far less secure. It is relatively easy for a fraudster to tamper with an EFTPOS machine or some other swipeable interface and collect data over an extended period without customer or operator being any the wiser.

"What the fraudsters do," says Gamble, "is they manipulate a terminal so it's tracking card data, sometimes for months. It just broadcasts via Bluetooth or Wi-Fi to a device sitting outside or in a roof cavity or whatever, and, over a period of time, it's getting thousands of credit card details. Typically [the fraudsters] then sell those details to someone else who will then manufacture cards, and they'll sell those to someone else who will go and withdraw the cash. There's a whole industry behind it that people aren't aware of. It's really massive."

Given the relative ease with which magnetic stripe cards can be compromised, just how common is this type of fraud?

"It's huge. And New Zealand doesn't have any disclosure laws, so people don't talk about it. Companies don't have to, and if you don't have to, why would you? If you're a big chain store, you're not going to go out and broadcast that your data has been nicked from you."

To combat escalating security issues, the main western credit card companies - Visa, MasterCard, Discovery and JCV – have formed what's called the Payment Card Industry Data Security Standards Council, with the goal of creating a consistent set of security rules across all card brands.

DSS compliance demands that the environment the credit card data travels in is secure. This means that the physical location must be secure, networks must be set up in a specific way, and sensitive data must be properly encrypted.

And it's worth merchants' while to get PCI compliant. If a terminal under your jurisdiction is insecure and fraud takes place, you'll likely find yourself liable for more than just the money stolen in the scam.

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IT'S NOT ABOUT BEING INTRUSIVE AND SELLING CUSTOMERS STUFF THEY DON'T WANT, IT'S ABOUT HELPING THE SHOPPING EXPERIENCE.

"If there is a card breach event, the bank has to appoint an auditor to go and work out how it occurred," says Gamble. "If the merchant is deemed to have been negligent in his or her responsibilities around their Data Security Standards then they're liable for the fraud, for paying for the investigation, paying for the fines associated… the list goes on."

"There's quite a big black hole underneath this that merchants need to know about."

Given the risks around card-based technology, isn't there a better way? In the end of course, the card is just a piece of plastic. In the age of mobile technology, isn't a card a little, well, old fashioned?

"Everyone carries a phone so there's no reason why you can't get rid of the cards altogether and use your phone," says Gamble. "Apple has applied for a whole lot of patents for the next generation phones. You'll be able to load a Visa card and a MasterCard on to it, so you just wave your iPhone, for example, over a wireless receiver."

"There's a company called FigCard which PayPal just bought and they have software on iPhones that you can walk into a shop and open up an app, put in a PIN number and wave it over their terminal and it pops up on the screen with 'you are about to buy…' and lists all the items and how much you are about to pay. You click 'yes, I agree', and the transaction all happens in the background.

Ultimately that's where it's going. In the future, you'll only have cards as a backup, say, if you lose your phone."

"There's no reason it couldn't all be done on a fingerprint," says Gamble. "You only need an identifier – or a retina scan. It could be anything."

Fly Buys' Chris Lamers, Head of Marketing & Product Development at FlyBuys NZ, concurs that card-based technology, while popular and convenient, is ultimately impermanent.

"My view is that [mobile NFC] technology is going to, when it arrives, take over very quickly," he says. "All it's going to take is a few big handset companies to put NFC in all their phones as standard and then very rapidly people are going to have this."

Although FlyBuys operates on the older magnetic stripe technology (and as a non-cash card, there's little reason why it wouldn't), the technology is currently serving the business well. FlyBuys is easily Australasia's largest loyalty program, with over 1.1 million members in New Zealand and over 10 million in Australia.

"The biggest growth area for us is in terms of analytics," says Lamers. "Over the last three years, we've completely rebuilt our data warehouse and analytics toolset, working with SAS and Oracle to make sure we have leading edge technology and systems for looking at shopping behaviour."

"When you keep in mind that we've got shopping behaviour for 71 per cent of New Zealand for fifteen years, analysing that data is critical, and it's only going to be as successful as the systems which allow you to access it."

Lamers says that the aim of data analysis is always to ultimately use that information to tailor your service to the customer.

"What we're looking for is insight that allows us to be more relevant and timely in our marketing. For example, let's say you own a house and you're just about to undertake a big renovation project. We're looking for the indicator that says you're just about to start a big renovation project, so that we can give you good offers. If you live in an inner-city apartment and you don't do any home renovation at all, well sending you offers about renovation from Mitre10 isn't going to work. But if you've just bought a rundown villa in Mount Eden however…"

The key, says Lamers, is not to get distracted by the numbers. It's to keep in mind the fact that tangible customer benefits are what will make an enterprise successful, not technology.

"It's not about being intrusive and selling customers stuff they don't want, it's about helping the shopping experience. It's about working with people. They share their data with you and you work out how you can turn it into a benefit for them, and in my experience there are very few companies that are doing that."