



BIOMETRIC PAYMENT CARDS

The Next Evolution in Secure Contactless
Transactions

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TABLE OF CONTENTS

1. The evolving market for biometric authentication – a short history	4
2. Market drivers	5
3. How it works: enrolment, activation and payment.....	7
3.1. Enrolment.....	7
3.2. Activation.....	8
3.3. Making a payment.....	8
4. Benefits of using biometric payment cards.....	9
4.1. For consumers	9
4.2. For issuers.....	10
4.3. For merchants.....	11
5. Looking to the future	11



Introduction

Back in 2013, the Smart Payment Association (SPA) published a vision paper that set out the guiding principles, specifications and implementation practices for implementing biometric cardholder verification mechanisms (CVM) on EMV cards. The SPA proposal for biometric payment cards was presented to the EMVCo Technical Associates program.

Within five years, EMVCo issued functional, security and performance biometric specifications intended to facilitate the worldwide interoperability and acceptance of biometric payment cards, and counter false rejections and imposter attacks. This was a key milestone, supported by SPA, that helped propel a number of new developments.

Today, the biometric payment card is set to transform how cardholders authenticate when paying, paving the way for issuers to provide customers with a contactless payment experience without maximum amount limits.

Over 20 biometric payment card pilots are currently active globally and the first commercial deployment by BNP Paribas has been launched. It will not be long before consumers everywhere will be able to embrace biometric fingerprint authentication for everyday payments. Indeed, according to the global tech advisory market firm ABI Research¹, biometric payment cards could reach critical mass deployment in the next year, a prediction confirmed so far by the momentum created by pilot projects.

With the biometric card market at a tipping point, this SPA paper explores what is driving and accelerating the demand for biometric payments cards, how cardholder enrolment and authentication is handled today, before looking ahead to what the future holds.

¹ ABI Research 2020 <https://www.abiresearch.com/press/25-million-biometric-payment-cards-be-issued-2021-second-generation-architectures-hit-market/>




1. THE EVOLVING MARKET FOR BIOMETRIC AUTHENTICATION – A SHORT HISTORY

Biometric authentication has been a mature technology for over 20 years with a host of applications in mainstream use – from allowing access to secure facilities with iris and fingerprint sensors, to speeding travellers through border control thanks to ePassports. Until recently, however, on-card biometrics sensors were not available for card-based payments.

This situation changed following progress in fingerprint sensor technologies that now enable vendors to develop ultra-thin sensors that can be embedded in smart payment cards together with the required microprocessors. This meant new biometric payment card products could be designed that enable on-card fingerprint enrolment and verification.

In 2017, Absa piloted the world’s first biometric payment card in South Africa, followed in 2018 by the Bank of Cyprus piloting the world’s first biometric dual interface card for both contact and contactless payments. In these pilots, the cards used allowed payments to be made with fingerprint verification during the transaction.

USE CASE: BNP Paribas Announces First Biometric Bank Card General Roll-out



BNP Paribas is the first major bank to make biometric payment cards available to its customers in 2021. The launch follows a commercial trial of 15,000 payment cards with fingerprint biometric authentication in 2020.

Initially the biometric cards are proposed to the bank's Visa Premier customers for an additional premium to the card's annual fee.

During the trial, the bank gave participating Visa Premier customers the option of an in-branch enrolment experience which proved extremely popular with customers who welcomed an opportunity to experience a direct in-person engagement with their local branch personnel.



Today, the improved speed and accuracy of biometric technologies, combined with recent manufacturing refinements, have reduced the per-unit cost of biometric cards. In particular, the cards do not require an on-card battery as the biometric sensor and microprocessors are powered by the payment terminal itself.

These improvements, together with the standardization of EMV and ISO certifications, have made biometric payment cards ready for mass deployment and prepared the ground for rapid growth of the market.

2. MARKET DRIVERS

In the wake of COVID-19, the adoption of contactless payment methods has accelerated globally as consumers everywhere opted for low or no-touch interactions.

Initially favoured by digital-native millennials, the ability to ‘tap and go’ has become the preferred payment option for all age groups, including tech-averse baby boomers. Indeed, according to a recent Visa² study, 63% of consumers would switch to shopping with a business offering contactless payment options.

This desire for reduced physical interactions and faster payments at the point of sale is now an embedded consumer behaviour. So much so that in the UK, contactless payments accounted for 88.6%³ of all card transactions in 2020.

USE CASE: Rocker In Sweden



Rocker was the first Fintech in Sweden and in the Nordics to launch a Visa biometric contactless card pilot in 2021.

Rocker is moving at a high pace to provide new and attractive innovations to customers. Launching biometric debit cards is part of their strategy to offer smart and secure payment solutions across platforms.

² <https://usa.visa.com/dam/VCOM/global/run-your-business/documents/visa-back-to-business-study.pdf>

³ <https://www.computerweekly.com/news/252495222/Nine-out-of-10-UK-card-payments-in-2020-were-contactless>



When it comes to consumer familiarization and acceptance of biometric technologies, today's smartphones universally utilize fingerprint or face recognition authentication technologies that make it quick and easy for users to unlock their devices. The convenience and security this affords users is fuelling the growing consumer demand for biometric payment cards that offer the same frictionless user experience, while ensuring even greater security in the event of their card being lost or stolen.

A recent Visa study⁴ of US consumers found that 86% of respondents were interested in using biometrics to verify identity or make payments, with 70% confirming that biometrics would be easier. Almost half (46%) went on to say they felt biometrics would be more secure than using passwords or PINs.

The research from Visa also found that more than two-thirds of consumers prefer to pay with contactless cards rather than using a digital wallet on their mobile device. Indications are that the mobile phone is still not the universal payment instrument of choice for the estimated 3.8 billion smartphone users around the globe⁵.

Indeed, since mobile payments are dependent on having a charged battery, most mobile payment users still use their bank card as an alternative and for any backup purposes. Also, many consumers continue to be wary about using their mobile phone as a payment mechanism, due to their concerns over the security and privacy of their apps or devices.

USE CASE: Crédit Agricole Issues Biometric Payment Cards In France



Customers of Crédit Agricole can now use their fingerprint to authenticate contactless payments using a biometric debit card issued by the French bank. Customers have the option of using an enrolment reader at home to register their fingerprint onto their card's chip or they can visit a bank branch to record their fingerprints onto the card.

Should they wish, the bank's customers are also able to upload their card to a mobile wallet.

⁴ <https://usa.visa.com/visa-everywhere/security/how-fingerprint-authentication-works.html>

⁵ <https://www.bankmycell.com/blog/how-many-phones-are-in-the-world>



3. HOW IT WORKS: ENROLMENT, ACTIVATION AND PAYMENT

3.1. Enrolment

When users receive a biometric payment card, they first need to register their fingerprint into the card.

If enrolment is carried out **at home**, the preferred method consists of the user inserting the card into a sleeve device, provided by the user's bank, that powers the card. The user then places their finger on the card's sensor in a variety of positions, until an indication is given, through LEDs or a display on the sleeve, that the process is completed. A reference template of the fingerprint is thus built and securely stored in the card.

If enrolment is carried out **at a bank branch**, the card is inserted into a card reader and a similar process is followed.

In both enrolment scenarios, no biometric data is transmitted online or to any other device than the card.

More generally, with biometric payment cards, no biometric details are ever shared or transmitted to any third party – the fingerprint data stays securely stored in the chip of the card and is not accessible. This implementation complies with GDPR (General Data Protection Regulation) mandates on the processing of biometric data.

USE CASE: MATCHMOVE IN SINGAPORE



Matchmove, a Bank As a Service Provider in Singapore, who aims at democratizing essential financial services using advanced technologies, has launched a pilot in partnership with Mastercard in 2021. The pilot is in line with **Matchmove**' strategy to empower their customer to make safe and secure payments.

To support the onboarding process, the option of a home enrolment using a sleeve device was preferred for maximum convenience.



3.2. Activation

The activation of the fingerprint in a biometric payment card is a highly recommended process which ensures that the enrolled fingerprint is that of the genuine cardholder. There are various methods for activating the fingerprint.


The most common method is for the issuer to configure the card to request PIN verification for the very first transaction after the enrolment, typically at a Point-Of-Sales (POS) terminal. The PIN is known only by the cardholder and its verification therefore authenticates the cardholder. The enrolled fingerprint is subsequently activated.

Other methods include user identity verification at the bank branch at the time of fingerprint enrolment or calling a call centre and establishing user identity through a Know-Your-Customer procedure.

3.3. Making a payment

Biometric payment cards are fully operable with existing payment POS terminals that accept EMV-based contact or contactless cards. There is no requirement to replace existing terminals and hardware upgrades are unnecessary. When cardholders make a payment, they simply pass their card near the contactless payment terminal or insert the card on a contact terminal, while placing their finger on the sensor of their card. Verification does not add much more to the perceived time a payment transaction takes.

USE CASE: JKB Issues Biometric Cards In Jordan



Customers of the Jordan Kuwait Bank (JKB) will soon be able to make contactless payments using a biometric bank card that enables them to authenticate contactless transactions without the usual payment limits, using their fingerprint.

The cards are being distributed to the bank's Mastercard World Elite customers, who will be able to enrol their fingerprints on the biometric card without having to visit a branch. In addition to making point-of-sale purchases, cardholders will be able to use their biometric cards to make online purchases and ATM cash withdrawals.



The limit of typically 50€ for contactless payment with a simple tap no longer applies when the user is authenticated by means of the fingerprint verification. Higher payment amounts are possible, the only limit being that of the card contract established by the issuer with the cardholder.

Should the cardholder's fingerprint not be readable, or the biometric sensor not be physically accessible (when, for example, the card has been fully inserted into an ATM card slot), the card instructs the terminal to fall back to the next preferred user verification option – for example a PIN code.

4. BENEFITS OF USING BIOMETRIC PAYMENT CARDS

4.1. For consumers

The primary benefit of biometric card payment for consumers is the convenience of fast and secure contactless payments without the limit on the amount currently imposed by regulation.

The fingerprint-based user verification method also protects consumers, ensuring that a lost or stolen card cannot be used fraudulently. It will also reassure those consumers that are wary of their contactless card being debited without their consent.

USE CASE: Edenred Announces First Biometric Card For Social Welfare In Mexico



Regional test of biometric card technology in Mexico

Focused on state benefits programs, Features an embedded fingerprint sensor that provides an additional layer of security to conveniently verify the cardholder's identity for in-store purchases.

The biometric features can be implemented on any Mastercard card product (credit, debit, prepaid) and work with existing EMV card terminals globally, helping merchants enhance the shopping experience without requiring any hardware or software upgrades.



For many consumers, the biometric smart card with fingerprint stored and verified in the chip delivers an improved perception of security, versus the use of mobile phones which are sometimes viewed by consumers as prone to malware attacks.

The fallback of being able to use a PIN should a sensor be unable to read the fingerprint also provides comfort to consumers that they will be able to use their card in all circumstances.

4.2. For issuers

The convenience and limitless payment of biometric payment cards translates into larger volumes of transactions for greater amounts, resulting in higher revenues from transaction fees.

At the same time, better cardholder protection and user consent in contactless payments will result in less customer complaints and chargebacks.

The simple yet rigorous enrolment and activation process demonstrates that issuers take the privacy and security of their customers seriously.

Finally, the biometric payment card provides issuers with the opportunity to position their consumer offering favourably, thanks to an innovative new payment option they fully control. In this respect, biometric payment cards represent an interesting addition to third-party mobile wallets.

USE CASE: Bank Pocztowy Makes Transactions More Convenient And Secure For Customers



In October 2021, Bank Pocztowy became Poland's first biometric payment card provider with its launch of contactless biometric cards for customers. At launch, a fingerprint match will be required for all transactions, not just those over a certain threshold.



4.3. For merchants

Merchants will be able to leverage their existing investments, as the biometric payment card can be used for contactless payments with no modification of their POS equipment.

As biometric payment cards enable payments above the maximum amounts set by regulation, merchants will be able to drastically reduce disruption to the consumer payment experience since consumers will not be required to insert their card or enter a PIN for large transactions. This both reduces queuing time and eliminates any need to educate consumers.

5. LOOKING TO THE FUTURE

The biometric payment card has the potential for tremendous growth, thanks to the clear benefits it brings both consumers and issuers. Ongoing pilots and commercial launches are all providing excellent results and positive feedback and SPA is confident that many other commercial deployments will continue in 2022.

Beyond these deployments, SPA members are actively contributing to the development of ISO standards on the security of biometric payment cards. This effort will provide bank card issuers with the assurance of vendor multi-sourcing.

Biometrically-enabled payment cards are also playing a key role in improving welfare and financial inclusion. Across Africa, South America and the Indian sub-continent, multi-application smartcards are being planned that will bring identity and payment together – authenticating users to simplify consumer-to-merchant payments, while allowing the effective targeting and distribution of government-based welfare payments.

Adding biometric functionality to an EMV card can also contribute to making cards more widely accessible in areas with a high illiteracy rate. This has the potential to facilitate access to financial services for individuals not used to PINs or passwords.

In this context, biometrics offers a convenient, easy-to-implement solution to verify customer identity when no other official government credentials are available. Similarly, biometric authentication makes it possible



for payment cards to enable cash withdrawal and other transaction services at ATMs or self-service bank kiosks.

On the eve of a major digital evolution with the deployment of central bank digital currencies, SPA is also actively looking at applying the benefits of biometric payment cards to secure digital and crypto currencies wallets. Similarly, biometric authentication will make it possible for cardholders to securely pay with digital currencies.





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