Biometric cards –
a future pre-requisite for secure & convenient contactless payments

Ursula Schilling, Omnisecure 2020
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Agenda
Biometric System on Cards in Payments

1	Why Biometrics?
2	Challenges & chances
3	Innovations as basis for Biometric Smart Cards
4	Conclusion

Convenience is king for the future of payment

EMV migration in 3 years:
>4bn cards
>75% contactless

#contactless payments)))

Transit adopts "open loop" & EMV worldwide, working in parallel with closed loop systems

#EMV goes transit

Phones, rings, wristbands, watches, fitness trackers, key fobs, stickers, coffee cups…

#consumer's appetite

Technology enablers increase security and convenience

#biometrics + digitization

Biometric offering on card in payments is up and coming…

Source: Fingerprints' biometric pilots, Dec. 2019

Why you'll soon be paying for everything with your finger and face

Source: Independent; Jul 2018

"It is using an individual's physical characteristics to serve as an identifier, much more secure than a PIN or password that can be copied or stolen"

Your next bank card will have a fingerprint scanner built-in

Mastercard says it is ready to issue thousands of biometric bank cards as its fingerprint scanners can be used everywhere. But, will people want them?

Fingerprint authentication moves from phones to payment cards

Debit card with built-in fingerprint reader begins trial in the UK

Source: https://www.theverge.com/2019/3/11/18259624/natwest-gemalto-debit-card-fingerprint-scanner-biometric-contactless-nfc-uk

There are 3 main target applications for biometrics on smart cards, all focusing on convenience without compromising security

Payment

› Biometric **proximity cards** are very convenient in combination **with CL** infrastructure
› **High-end** security **differentiation** for the banks
› Official **regulations considering biometrics**, such as European PSD2
› Biometric **applied to DCVV** to enhance **e-commerce security**
(~10% of total powered card market)

Digital ID

› **"Digital ID"** including fingerprint authentication
› **Digitalization process: convergence** of physical and digital identities merging payment and ID applications -> citizen cards
› **Social inclusion** in emerging countries

Transport // access

› Biometric as **additional authentication factor for access**
› **For convergence with payment & transit** cards incl. security advantages for PTOs

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The mandate for Strong Customer Authentication (PSD2) in Europe can trigger BSC growth

› **SCA** mandated by EBA in 2019

› Two or more mutually independent factors are required (ownership of card + biometrics or PIN)

› Already now **every fifth contactless transaction being rejected** to force an authentication, creating frustration at the point of sale

› Biometric authentication is considered to be the most **convenient way to be PSD2** compliant

› **More regions to follow** towards SCA due to huge fraud rates especially for CNP → opportunity for **dCVV**

Why biometrics?

Biometrics has achieved **HUGE SUCCESS** in mobile

60% smartphones now have biometrics

42% of consumers prefer fingerprints as most likely ID method for digital payments

Fingerprint has replaced pins/passwords to be the most popular way to authenticate on mobile

The rise of **POWERED CARDS**

Market growth [m pcs]

140
120
100
80
60
40
20
0

2020 2021 2022 2023 2024

Source: Fingerprints™ market research in collaboration with Kantar TNS, 4000 online consumers in UK, USA, China, India

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Slide 1

**Biometric fingerprint solutions
used in a range of devices & applications**

Slide 2

Consumer experience drives the benefits of all stakeholders
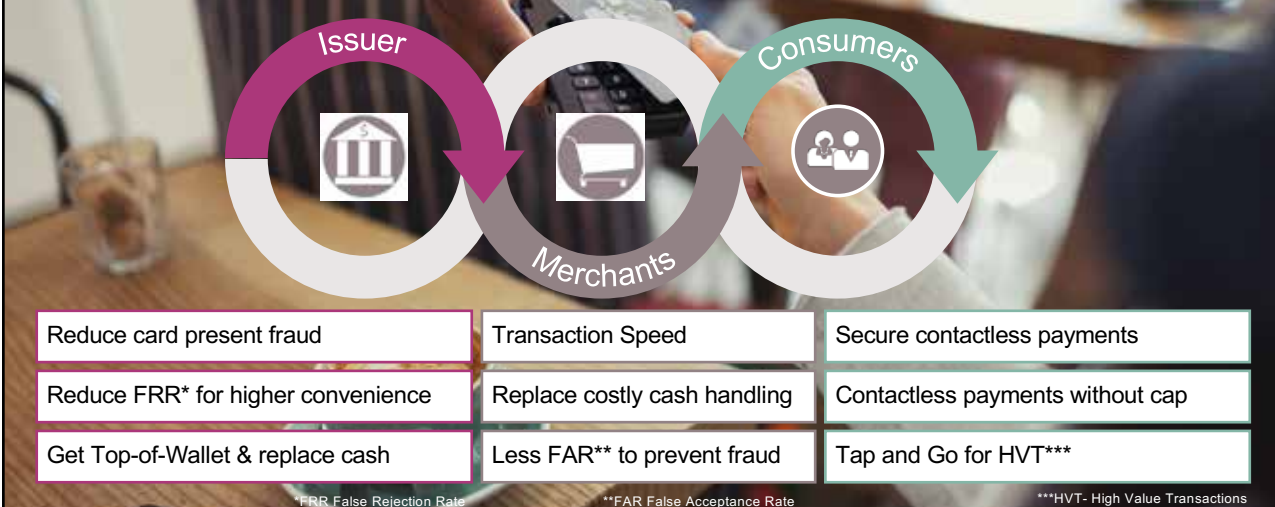
Issuer

Consumers

Merchants

Reduce card present fraud	Transaction Speed	Secure contactless payments
Reduce FRR* for higher convenience	Replace costly cash handling	Contactless payments without cap
Get Top-of-Wallet & replace cash	Less FAR** to prevent fraud	Tap and Go for HVT***

*FRR False Rejection Rate   **FAR False Acceptance Rate   ***HVT- High Value Transactions

In addition to consumer demand, regulation and standardization work from industry & approval bodies is needed

Standardization

› Biometric authentication in **CL infrastructure NOW**
› Biometrics technology is **proven and replaced PIN already in 2bn smartphones**
› For payments contactless cards are known and established form factors – **no battery**
› **Common set of specifications & feature requirements** would speed up mass production

3

1

2
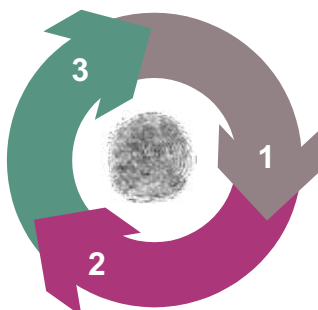
Convenience

› Consumer **convenience** with **improved security** and user experience
› "**Get-rid**" **of PIN** for secure transactions
› **Less denied contactless** transactions => Less FRR & FAR
› Shorter queues at POS

Regulations against fraud!

› PSD2 European regulation requires multi-factor authentication (opportunity for fingerprint)
› **Avoid security concerns with contactless** CP payments
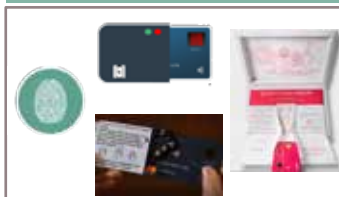› **Reduced CNP / e-commerce fraud is required → big opportunity for dCVV**

Biometric cards still facing some challenges…

Cost and complexity

› High BoM and development costs
› Complex card design
› Big yield loss
› Lamination integration process
› Sensor size
› Biometric matching algorithm
› Certification process

Biometric enrollment

› Different options
  – "Stand alone" sleeve or box with small battery power source
  – Via App using the smart phone
    → ++ low cost, convenient
  – At the bank branch
    → - - less convenience
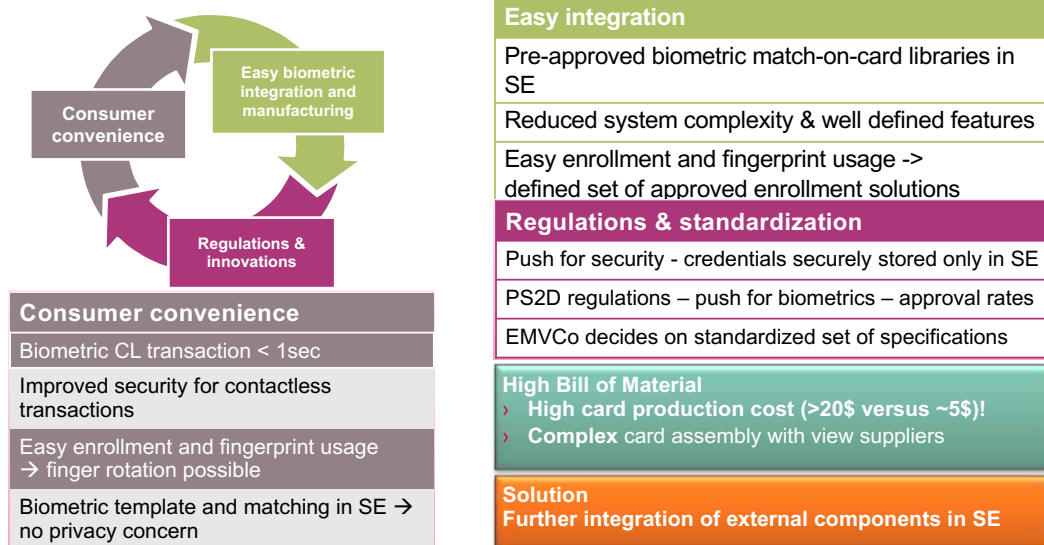
Commercialization

FINGERPRINTS   IDEX
zwipe   NEXT
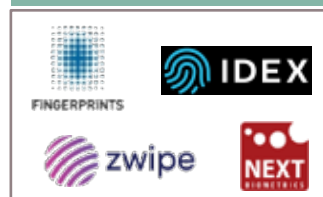
› Existing business model with customers
› Possibility to establish new business model with partners
› MoC libraries implemented & approved in SE
› Quick ramp up with approvals & volume production available

Biometrics on payment cards

Agenda
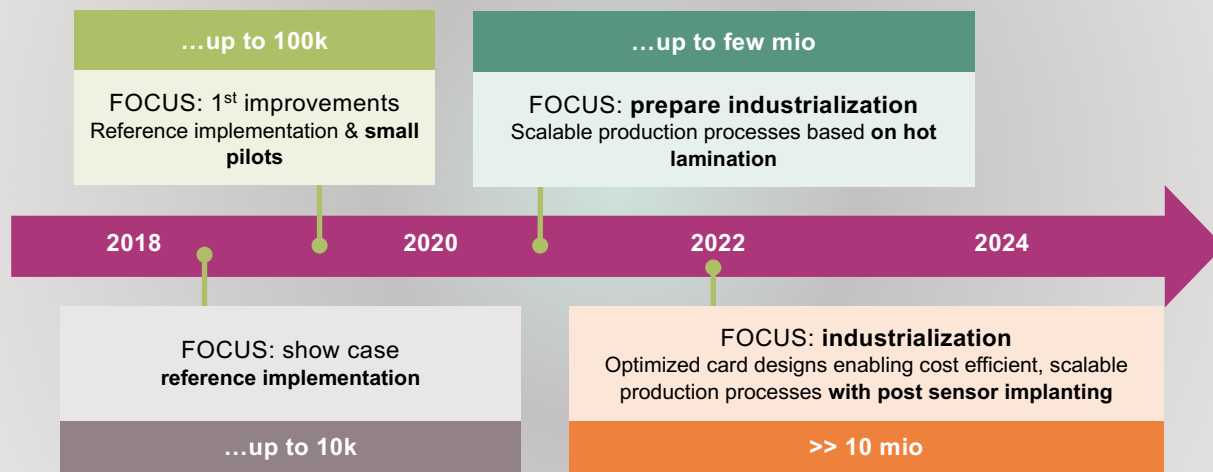## Biometric System on Cards in Payments

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How to solve the operational production hurdles ?

Easy biometric integration and manufacturing

Consumer convenience

Regulations & innovations

Easy integration

Pre-approved biometric match-on-card libraries in SE

Reduced system complexity & well defined features

Easy enrollment and fingerprint usage -> defined set of approved enrollment solutions

Regulations & standardization

Push for security - credentials securely stored only in SE

PS2D regulations – push for biometrics – approval rates

EMVCo decides on standardized set of specifications

High Bill of Material
› **High card production cost (>20$ versus ~5$)!**
› **Complex** card assembly with view suppliers

Solution
Further integration of external components in SE

Consumer convenience

Biometric CL transaction < 1sec

Improved security for contactless transactions

Easy enrollment and fingerprint usage → finger rotation possible

Biometric template and matching in SE → no privacy concern

Expected biometric card industrialization growth

Standard industrialization within existing production is KEY SUCCESS FACTOR for volume scalability

…up to 100k

FOCUS: 1st improvements
Reference implementation & **small pilots**

…up to few mio

FOCUS: **prepare industrialization**
Scalable production processes based **on hot lamination**

2018 **2020** **2022** **2024**

FOCUS: show case
reference implementation

…up to 10k

FOCUS: **industrialization**
Optimized card designs enabling cost efficient, scalable production processes **with post sensor implanting**

>> 10 mio

Infineon is shaping the BSC (Biometric System on Card) market

› **Leading** payment biometric **pilot phases** with our SLE78 family products

› **Partnering** with leading industry partners such as **biometric sensor companies** to get better system understanding and define future right fit product incl. storage of biometric templates in SE

› Support our partners and customers to **create reference designs** in today's most sold biometric payment product

› Future… we are **committed** with a biometric system **offering**

Strengthening the power of collaboration: Zwipe and Infineon extend their partnership

Infineon and IDEX biometrics join forces to advance biometric card solutions

Infineon and NEXT Biometrics introduce biometric card reference design

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What is our contribution for enabling a better consumer experience in payments?

› Extensive contactless system knowhow

› Continuous IC innovations from 65 to 40nm IC technology

› Best in class contactless performance with low power

› Specific innovations for BSC to enable power saving and highest security

› Partnering within the ecosystem for enhanced SE functionality

Conclusion

Biometrics will be key for financial services with BSCards growing rapidly: We believe in the market & opportunities → no mass production yet, but many pilots ongoing

There are various challenges the industry has to face / It's all about convenience → at **reasonable card costs**

IFX is a trusted BSC player: we are **actively contributing to the payment biometric piloting phase** and partnering with leading industry partners

BSC will happen **first in Europe due to PSD2** and SCA regulations with other regions to follow

Part of your life. Part of tomorrow.