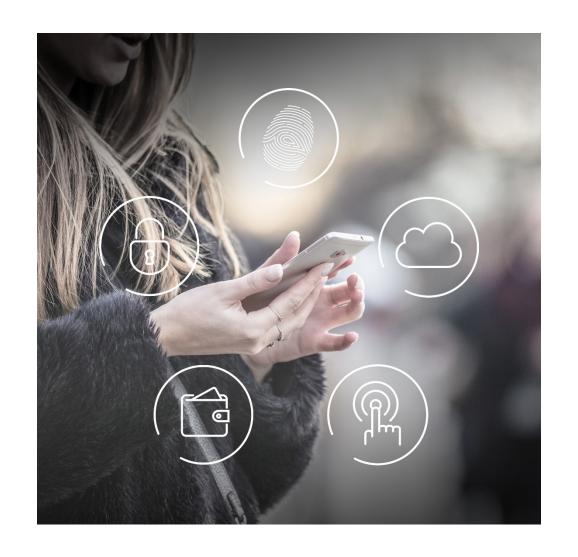


## Leading the market in biometric systems solutions

- Fingerprint Cards ambition is to become the technology and product leader in the biometric space
- This is the start of the biometric era, ranging from devices to cloud
- We will be market leader in our chosen segments.
- New organization to execute on the strategy



- Biometrics
- Security and convenience
- Cloudification
- Online payment/banking
- Digitalization (IoT)



# Future possible applications... and many more



E-look



Car (door)



NB



**Tablet** 



Smartcard



Car (starter)



Smart watch/Bangle



Portable HD



Remote controller



Motorcycle/Bicycl



POS



**USB** disk



Car key



Bicycle lock

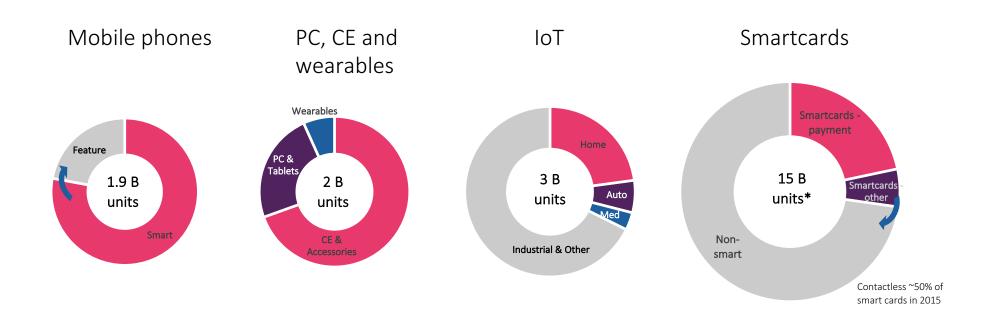


Home applications



Source: WPI

## We are only at the beginning of the biometric era



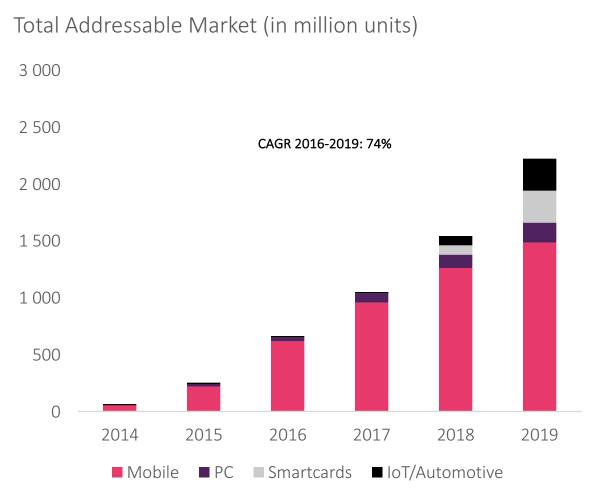
Source: Fingerprint Cards estimates on device shipments based on various industry sources.

<sup>\*</sup>Size indication of card donut only representing smartcards.

<sup>15</sup> B units represent both smart and "non-smart" cards not including SIM, phone or Pay-TV.



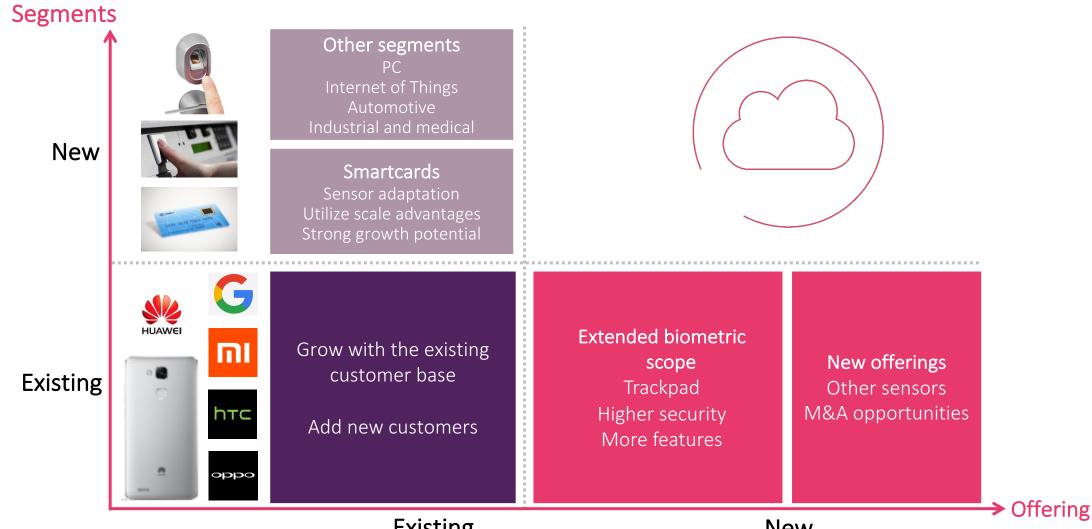
- Strong market growth in fingerprint sensors
- New segments to add substantial value for Fingerprint Cards in 2018



Source: Strategy Analytics, IHS, Fingerprint Cards estimates. Total Addressable Market excludes Apple, includes all other OEMs and segments including swipe technology

# Strategy for growth





Existing

New



### 1 Short term (2017)

- Defend and strengthen Fingerprint Cards position further in smartphones.
- Enable the roll out and kick-starting the new segments
- Continue innovation and strong IP portfolio

### 2 Mid term (2017-2018)

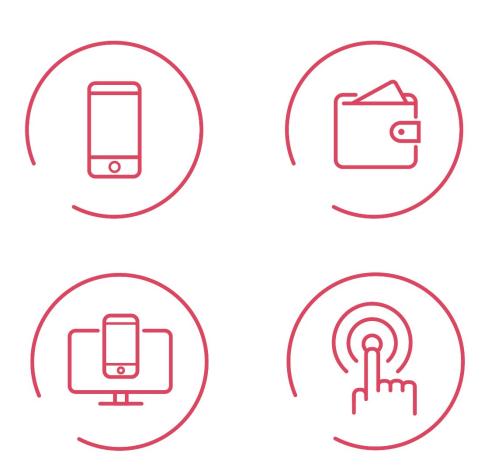
- Fingerprint Cards as a biometric company with several modalities
- Strong SW and system capabilities
- Investment in new vertical Smartcards, PC and embedded (IoT, Automotive)

### 3 Long term (2018+)

- Biometrics secure authentication and convenience everywhere
- Cloud and device in symbiosis
- Security as core in biometric offering



- Mobile
- Smartcards
- PC and embedded (IoT, Automotive)





- 1. Fingerprint sensor attach rate increasing  $\rightarrow$  market is increasing
- 2. Competition is here anticipated, we are prepared
  - Complete and competitive product offering
    - Winning designs in all segments, from cost centric spray coated to under glass flagship models
  - Industry unique wide customer base
  - Well established sales and support organization close to partners and customers
  - Proven scalable supply chain
- 3. Continued investment to further address second tier manufacturers and emerging markets



- Leading fingerprint biometric solution supplier for the smartcards market
- Engaged with all major card providers
- Products (FPC1320/FPC1321) available in commercial volumes now, ISO compliant on card level
- Pilots and initial volumes in 2017, revenues taking off in 2018

## PC and embedded (IoT, Automotive)



- High reuse from the Mobile portfolio
- Roll out of biometric module enables the IoT market
- Design wins with launch target in 1st half 2017 in the PC segment
- High growth area for Fingerprint Cards
- Long term: cloud-based biometrics

# Organization for growth and strategy execution







Operations & Quality Senior Vice President Jonas Spannel



Strategy & Corporate development Senior Vice President Jan Johannesson



Finance &
Administration
CFO
Johan Wilsby



Marketing & Communications Senior Vice President Heidi Berger



Business Line Mobile SVP Ted Hansson



Business Line Smartcard SVP Niklas Strid (acting)



Business Line PC and embedded SVP Niklas Strid



# Guidance for 2017



• Revenues: 7,500 – 9,500 MSEK

Operating margin: At least 35%

# Global leader in biometrics



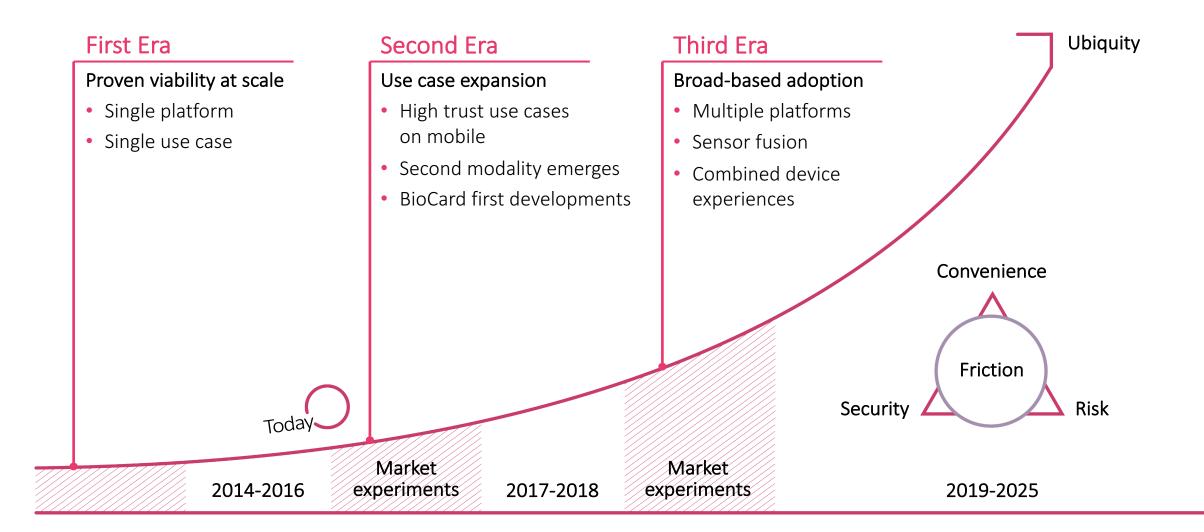
- Fingerprint Cards ambition is to become the technology and product leader in the biometric space
- This is the start of the biometric era, ranging from devices to cloud
- We will be market leader in our chosen segments
- New organization to execute on the strategy





# The move from unlock to pay... and beyond







### Megatrends

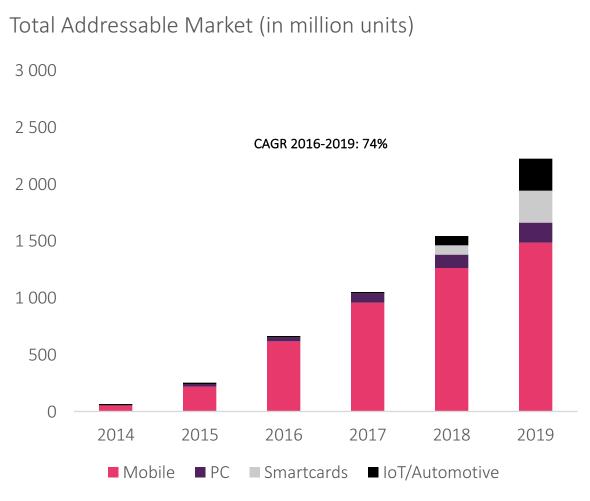
- Broad acceptance of biometric based mobile payments in Asia
- Growing acceptance of biometric based bank access globally
- Use of biometrics in smartcards for payments and for access control starts to emerge
- Ongoing development of connected biometric enabled devices



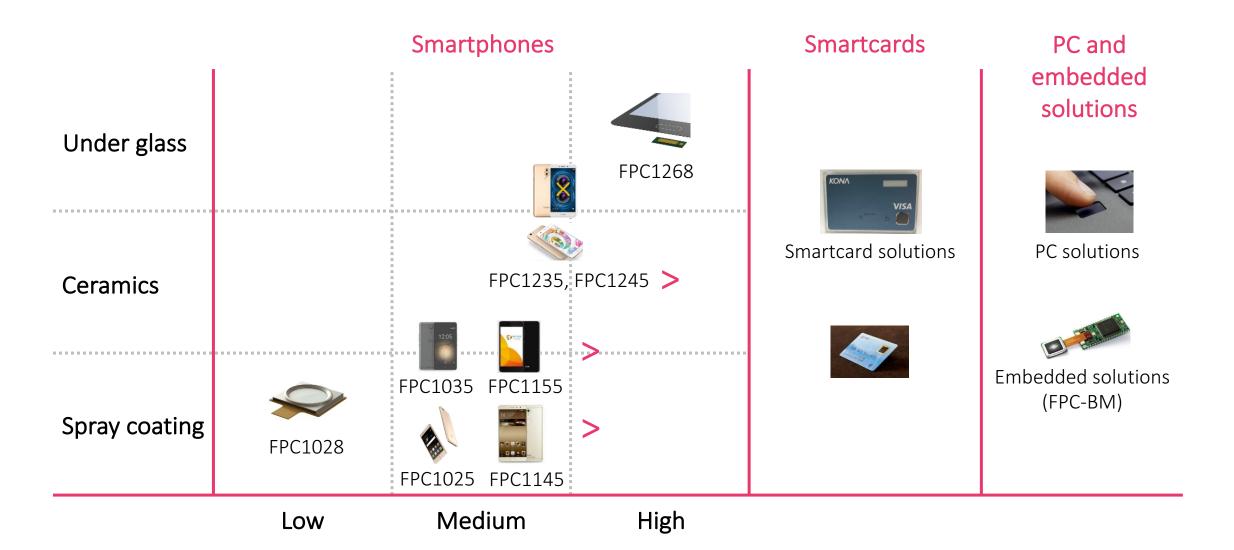
### New segments expand the fingerprint market



- Continued strong market growth in smartphones
- The market for biometric smart cards is expected to expand rapidly in 2018
- Attractive growth opportunity in PC
   low penetration rate



Source: Strategy Analytics, IHS, Fingerprint Cards estimates. Total Addressable Market excludes Apple, includes all other OEMs and segments including swipe technology





# Mobile business – growth continues



Strong market expansion from the high tiers to cover the complete smartphone market

```
High
Mid
Low
```



- System approach
  - Sensing die
  - Algorithm asset
  - Coating and under glass capabilities
  - SW integration
- Close customer relationship throughout the mobile value chain
- Key success factors include a fully deployed product portfolio and customer responsiveness



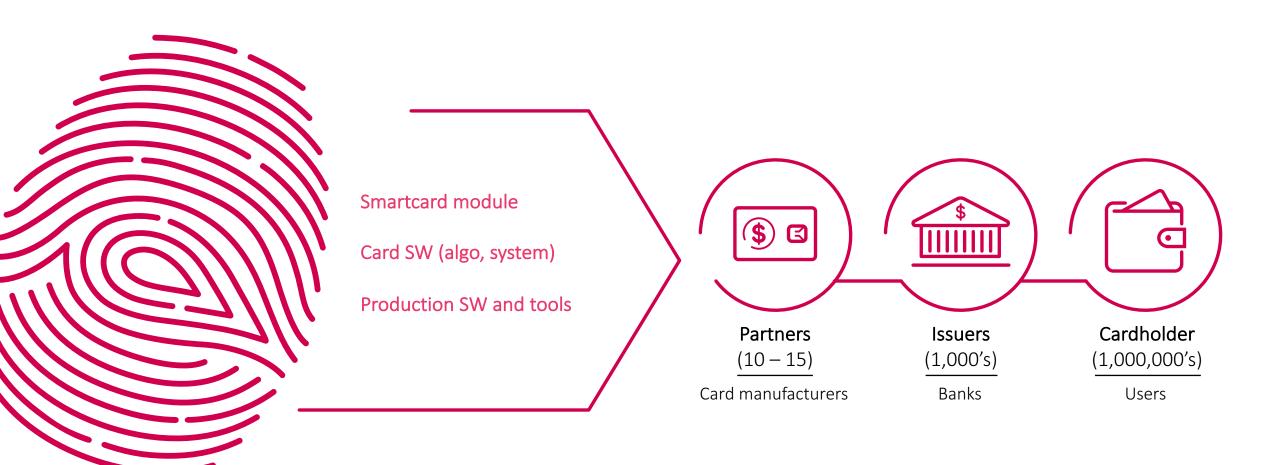




- Well positioned to serve the smartcard ecosystem
  - ISO compliance on card level reached with the FPC1300 series of sensors
  - Low power consumption and high accuracy
  - Adapted for high volume production
  - Complete biometric system offering
- Total Addressable Market (TAM) for fingerprint sensors in smartcards expected to expand rapidly in 2018
- A 3 to 4 billion gross market (units)









- A complete PC offering
  - Significant breakthroughs made in 2016
    - launches of the Huawei Matebook and HP Elite X3
    - significant synergies with the smartphone offerings
- TAM for Fingerprint sensors in PC's moves from approximately 40 million units in 2016 to >100 million units in 2018
- A 300 million gross market (units)





- The segment for IoT includes everything from wearables to smart homes and devices
- Automotive segment
  - security
  - convenience
- Total Addressable Market (TAM) for IoT expected to expand rapidly in 2018
- A 3 to 4 billion gross market (units)



## Strong growth opportunities beyond smartphones



- Strong market fundamentals
- Market leadership in smartphones forms a significant platform
- Continued innovation secures future growth in new segments



## Three drivers of global engagement excellence





#### 1. Sales to device OEMs

Sales, support and market requirements



### 2. Platform providers

Platform integration, evolution and security



### 3. Commercial & government

specifications

Creating market pull and ensuring favorable regulatory frameworks



# Local engagement to leverage megatrends



Platforms, standards and security

Google Microsoft EMVCO Fido Alliance GlobalPlatform Other

**OEM** opportunities



# Trend: Platforms getting serious about hardware







































Accelerated use of fingerprint sensors on android handsets globally

#### Development timeline

- 2014 to early 2015
  - Collaboration with Android team to develop fingerprint sensor HAL for Android M release
- May 2015 (Google I/O conference)
  - Announcement that Fingerprint Cards supported Google in the development of fingerprint sensor technology for mobile devices





### Commercial engagement timeline

- 2014
  - Deep collaboration with the Google Nexus team on HW, SW and industrial design elements of Nexus smartphone fingerprint sensor design
- September 2015
  - Google Nexus 5X and Nexus 6P launch with Fingerprint Card's OneTouch® FPC1025 fingerprint sensor solution
- October 2016
  - Pixel & Pixel XL Phones launch with Fingerprint Card's OneTouch® FPC1025 fingerprint sensor solution including FPC gesture/navigation capability and enhanced security software

# US tech industry drives innovation



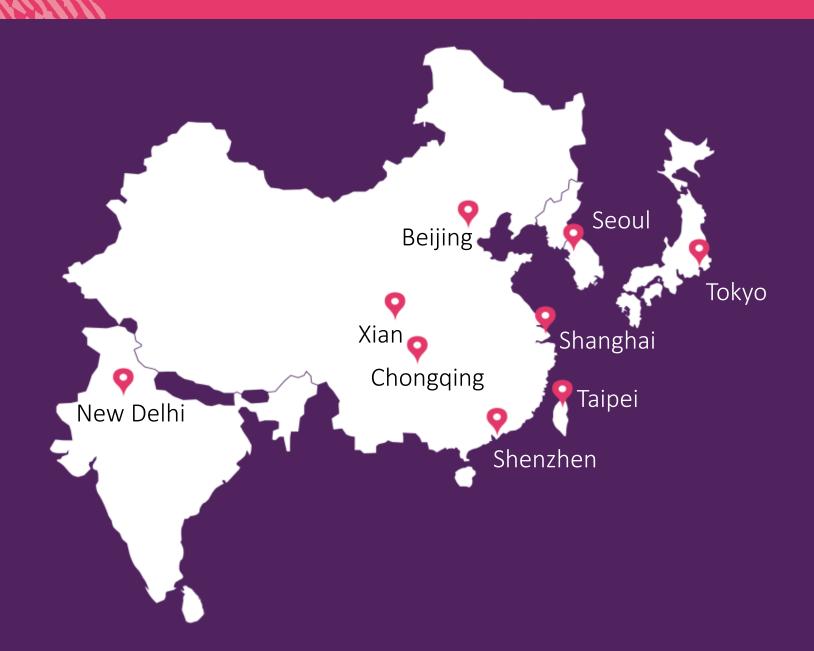
### Highly trusted partner

- Sales to device OEMs: Sales, support and market requirements
- Platform providers: Platform integration, evolution and security
- Commercial & government specifications: Creating market pull and ensuring favorable regulatory frameworks
- Significant influence and growth potential
  - Existing proven platforms: Mobile and PC
  - New product categories: Cards, IoT, wearables
  - OS/Service platforms → Hardware



### Fingerprint Cards in Asia







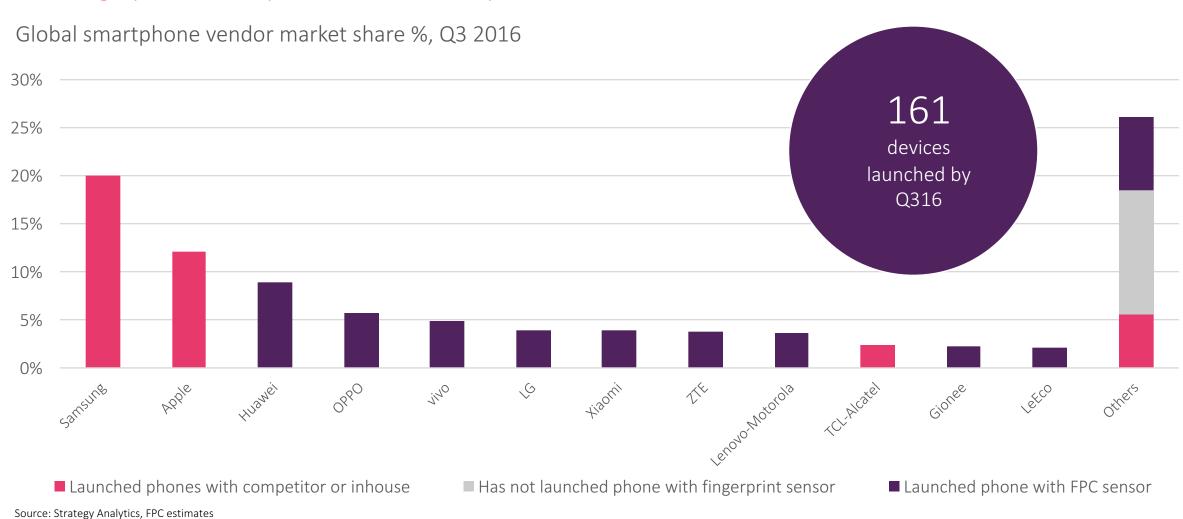
Kenneth Fredriksen CEO Huawei Sweden



### Expanding our footprint



#### 2016 fingerprint sensor penetration in smartphones: above 50 %



### Strong presence and an attractive broad portfolio





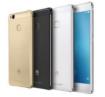






























































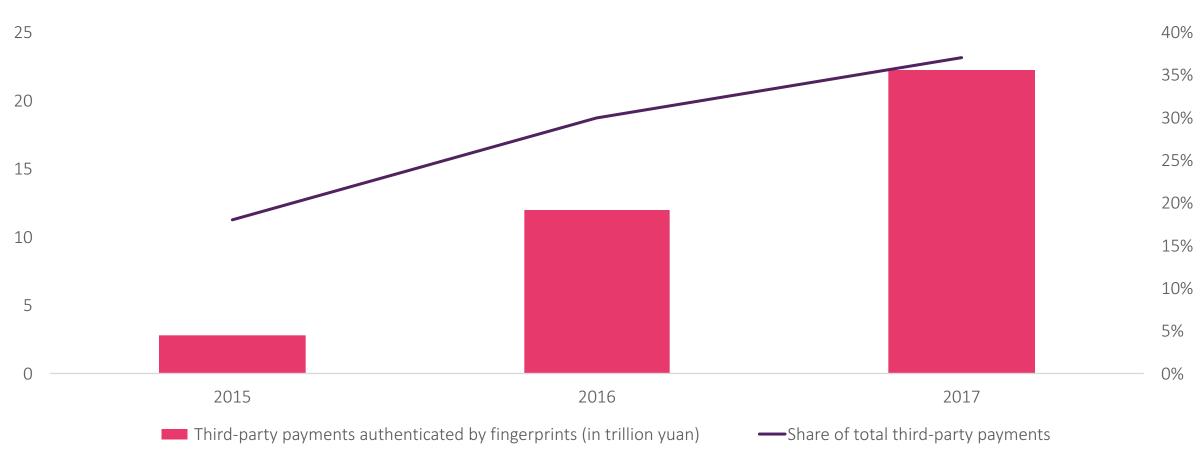




### Strong growth in China's third-party mobile payment market



#### Third-party payments in China authenticated by fingerprints



Source: Sunrise research institute



- Navigation
  - Slide down for notification board
  - Slide up for shortcuts
  - Slide left or right to switch between apps
  - To replace the Android side keys
- Different fingers open various apps
- Only one tap
  - To enter personal desktop
  - To launch Alipay
  - Snapshot
  - Screen shot



### Further growth opportunities with Asian customers



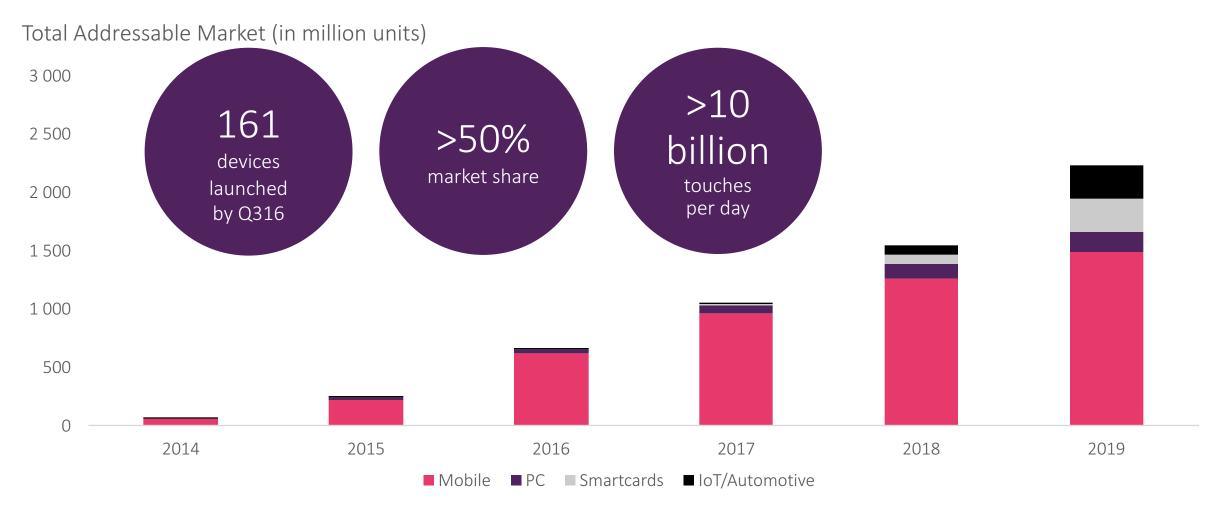
- Maintained market leadership in China since 2014
- Continued innovation to capture growth
- New business opportunities in markets and applications

# Q&A



### Advanced technology made simple





Source: Strategy Analytics, IHS, Fingerprint Cards estimates. Total Addressable Market excludes Apple, includes all other OEMs and segments including swipe technology



- A global technology leader
  - Unique and extensive experience in touch fingerprint sensor technology
  - Leading technology and products
  - Full system know-how and IP
  - Robust and scalable solutions
- Dedicated staff
  - 250+ R&D engineers
  - High competence
  - High educational level
  - ~25% PhDs



# Research & Development at Fingerprint Cards – Roles and capabilities

Transfer to

production

at multiple

sites





Solving production and yield issues

Improving the products through-out the lifecycle (maintenance)

Research and long term development of new technology and IP

### A broad IP portfolio



- >120 granted patents
- Increased innovation capacity and innovation speed
- Actively monitoring new patent applications and competing technology
- Capacity for running multiple technology projects in parallel
- Constant pipeline of new solutions



### Strong focus on under glass integration



- The mobile phone use case is changing
  - Front side in addition to back side and side-mount
  - Industrial design requirements
  - Need for seamless fingerprint sensor integration
- New challenges due to thicker materials on top of sensor
- The FPC1245 success with ceramics
  - First FPC under glass solution



### FPC1268, for glass based applications



- First true under glass sensor
  - For home buttons with glass
  - Mounting under cover glass for a seamless design
- Integrated in Huawei Mate 9 Pro + Porsche Design
  - First customer product launch with FPC1268
- Enabled through our holistic offering
  - New sensor and companion chip design
  - Novel packaging design
  - Significantly improved algorithm solutions
  - Software and tuning tools for production



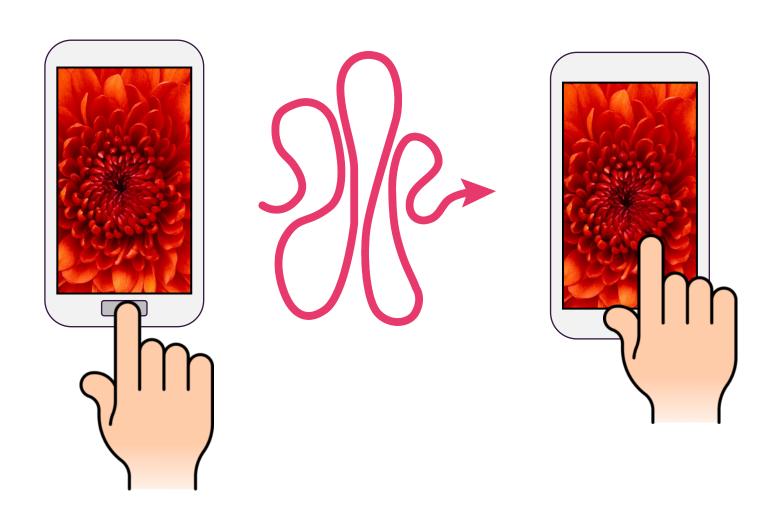
### Alternative sensing methods



- Our active capacitive technology is evolving rapidly
- In parallel, actively working with alternative sensing principles
- Ongoing development
  - Specific aspects on integration with the display
- Dedicated team for development
  - Increased focus









#### Two fundamental challenges must be solved

The sensing elements must be somehow integrated with the display

Displays are protected by a rather thick cover glass and the sensor must be able to read through it

Δ

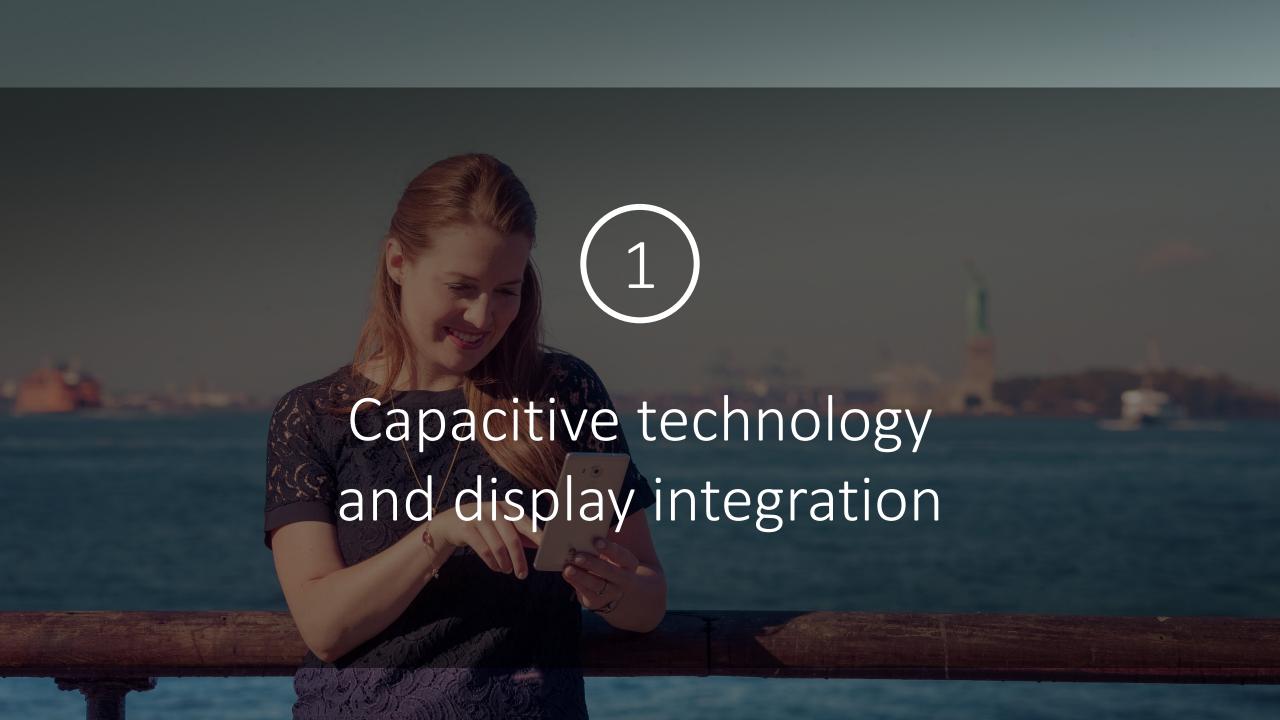
No significant impact on the display image quality

3

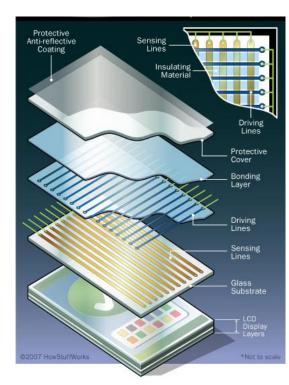
Minimum power consumption increase

C

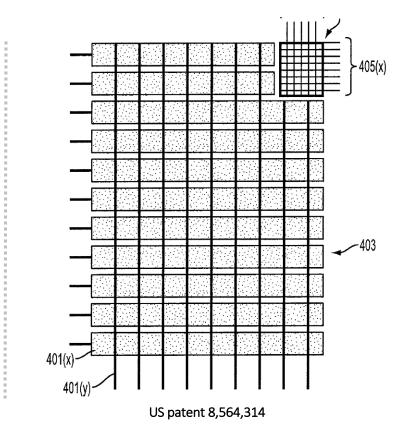
Ease of use with proper wake-up function



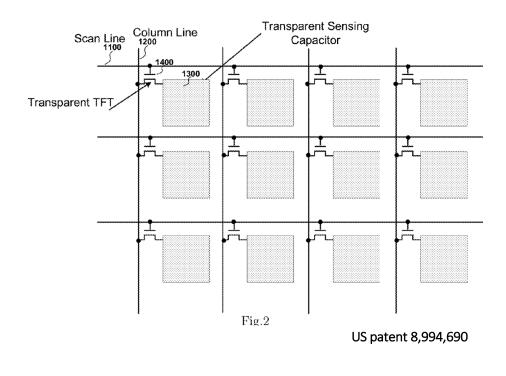
Would it be possible to increase the resolution in common P-Cap touch technology to achieve in-display Fingerprint sensing?

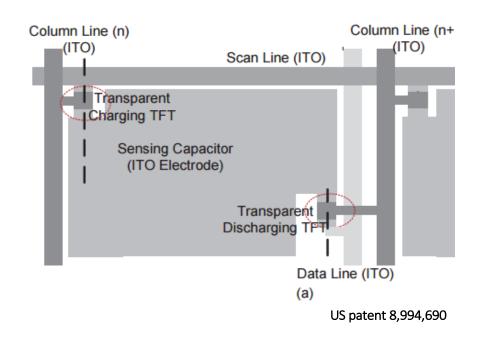


Source: http://digi-pro.com

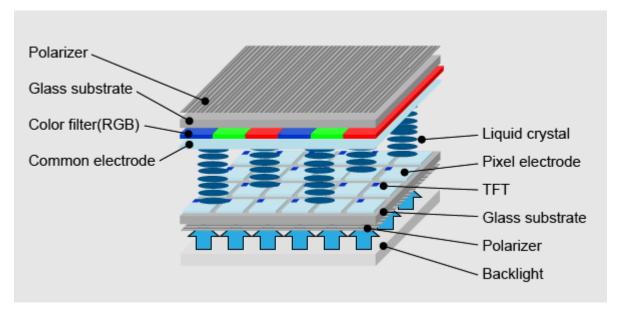


# Would it be possible to get an acceptable signal using a technology such as transparent TFT (ThinFilmTransistor)?





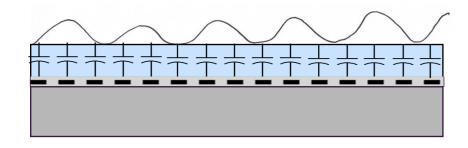
Can we integrate the fingerprint sensing within the display pixel (such as in-cell touch) and hence get access to the TFT backplane?



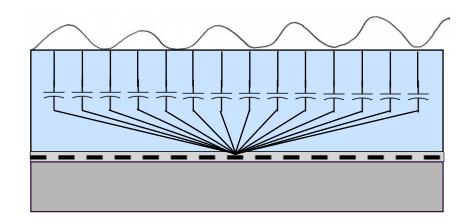
Source: http://www.j-display.com/

### Principle of capacitive sensing





The <u>ideal</u> capacitive fingerprint sensor



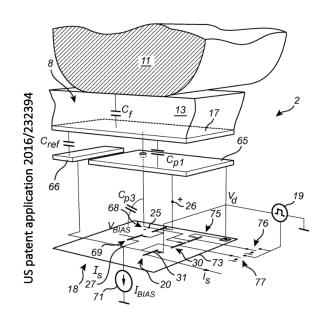
The **actual** capacitive fingerprint sensor

- In an actual device, each pixel receives signals from neighboring areas
- This effect gets exponentially stronger with thicker coating/glass

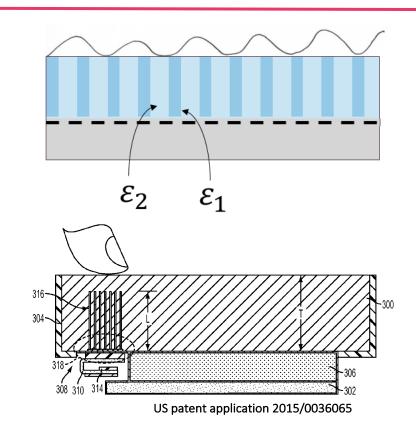
### Capacitive - Solution

#### Advanced detection schemes

Fingerprint Cards has invented and continues to invent detection schemes that allows for smaller and smaller amount of electric charge to be detected



#### Modified cover glass



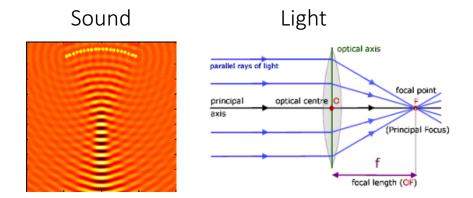


#### What is the root of the Challenge?

#### **Dynamic Field**

Propagating wave

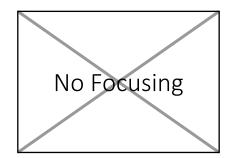
Sound, Light



#### Static Field

No propagating wave

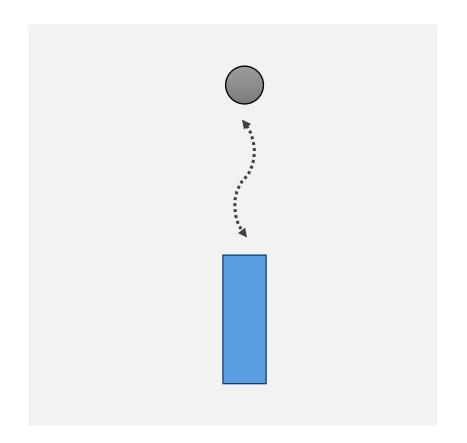
#### **Electrostatics**



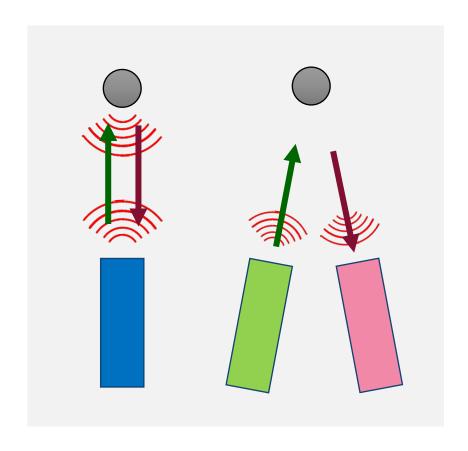




#### Non-Echo based

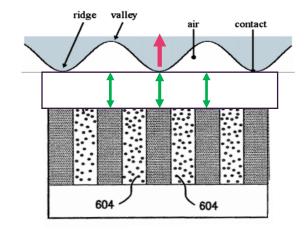


#### Echo based

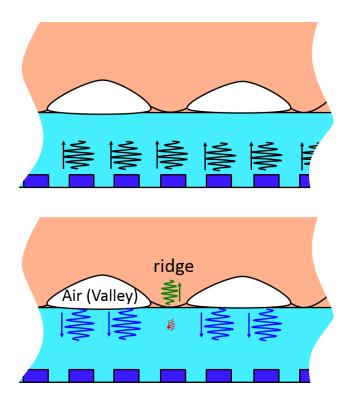




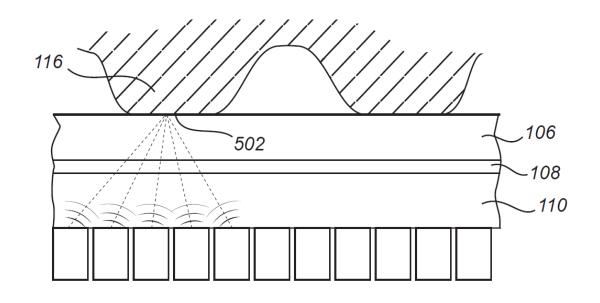
#### Non-Echo based



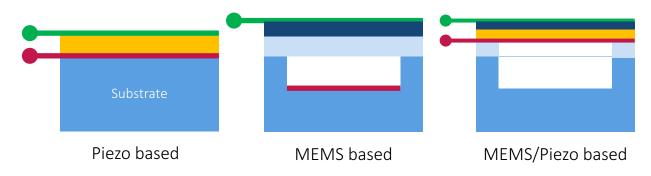
#### Echo based

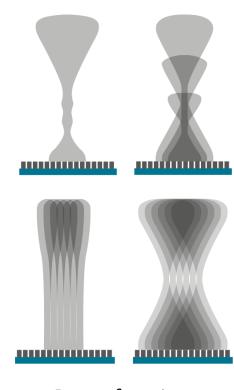






Many different pixel implementations



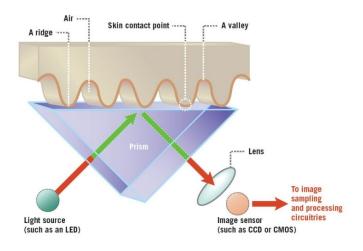


Beam forming

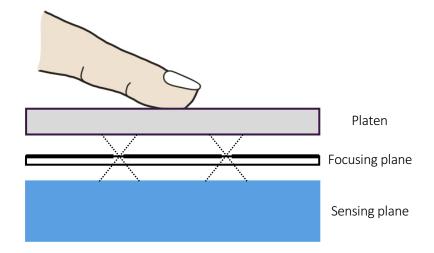


### Optical FP Sensing - Principles

#### Traditional optical fingerprint sensors

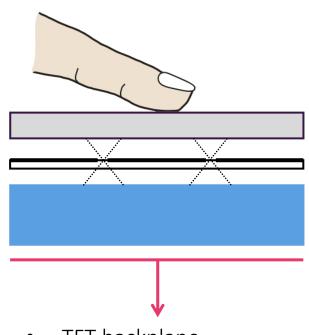


#### Flat optical fingerprint sensors

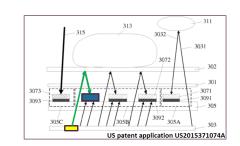


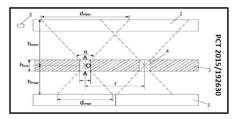
### Optical FP Sensing - Principles

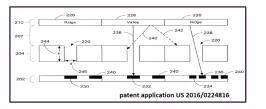
#### Many different implementations of the pinhole array



- TFT backplane
- CMOS backplane







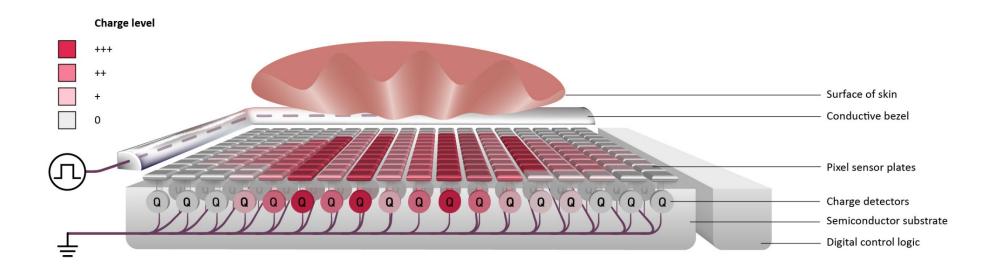
## Summary of alternative sensing

	Capacitive	Ultrasonic	Optical
Integrate-ability	Excellent	Good	Limited
Thickness handling	Limited	Good	Excellent
Main advantages	Maturity, simplicity, inexpensiveness	Beamforming, wide range of cover material (glass, metal)	Very high resolution, thickness handling
Main disadvantage	Exponential defocusing with cover thickness	Low maturity, cost, complexity	Power consumption, visual impact on display, require (IR or visible) cover transparency
Summary	An unbeatable fingerprint sensing technology for integration under thin, electrically non-conductive materials. Integrating the capacitive technology with display will almost certainly depend on the reduction of the thickness of cover glass.	A promising technology with the capacity of reading through thick and both electrically conductive and nonconductive materials. A number of display integration alternatives are available, although it still has low maturity and is expensive.	A technology capable of obtaining a high resolution image under a thick cover glass. The integration within the display panel would most likely have noticeable negative impact on the visual performance of the display.

## Evolution of the performance and applications

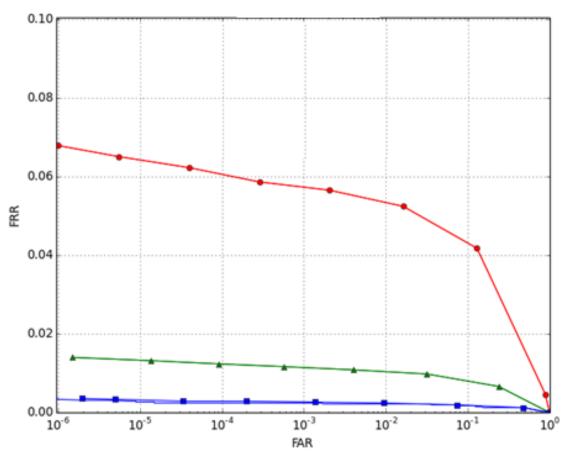


- Alternative sensing development complement to active capacitive sensing
- Large portions of the system remain the same
- Strong track-record in continued performance improvement with capacitive
- New application areas for capacitive technology





- In-house algorithm and software optimized for smartphones
  - Improved security
  - Convenience for all finger types
  - Latency
  - Memory
- The FPC1028 our smallest sensor
- Finger detect functionality and power consumption



FRR = False Rejection Rate – convenience level FAR = False Acceptance Rate – security level

## Spoof finger detection — FPC SafeTouch<sup>TM</sup>



- Introduction of FPC SafeTouch™
  - Augments security by allowing rejection of verification attempts using so-called fake fingers (spoofs)
  - Improves the already inherently good anti-spoofing ability of Fingerprint Cards sensors
  - Takes advantage of the advanced sensor design
  - Is compatible with existing range of Fingerprint Cards sensors
- Increased security
  - With small average cost in decreased convenience (increased FRR; False Reject Rate)
  - Value-add for e.g. payment use cases
- Differentiating feature







- Supporting all the major mobile platforms and secure environments
- Includes navigation/track-pad support enabling convenient onehanded interaction with the device
- Great example of integration in Google's Pixel phone



## Sensor systems dedicated to cards



- Success factors
  - Solid biometric performance embedded in the card
  - Low power consumption
  - Ultra-thin package
  - Card needs to be bendable
  - Resistant to scratches and everyday wear-and-tear
- Card applications
  - Targeted into FPC1320 and FPC1321
- High security and convenience
- The next generation system under development
  - Targeting an extremely low power consumption



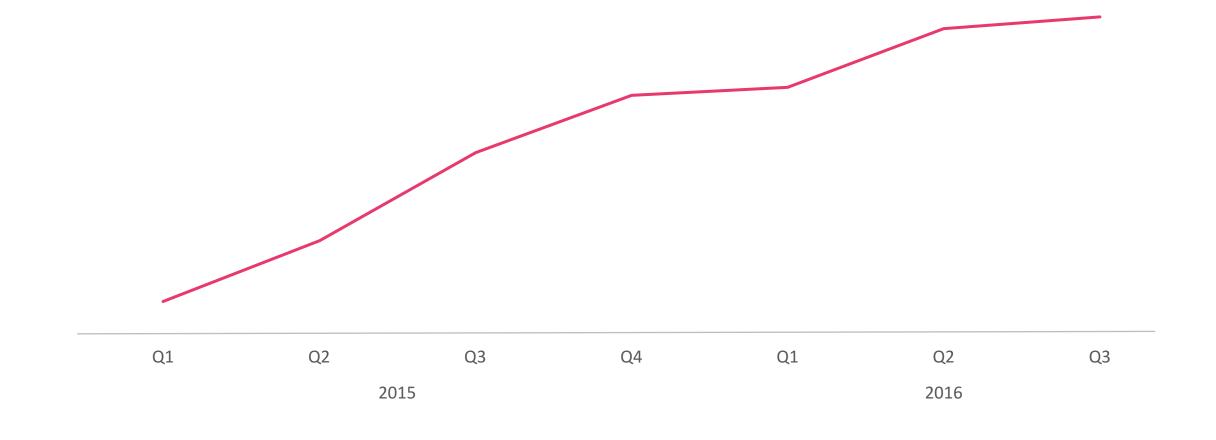




- Advanced technology made simple
- Strong innovation capacity and new products for continued mobile success
- Alternative sensing principles are being developed in parallel to capacitive technology
- Bringing our technology into products for new segments
- Brilliant engineering team growing beyond 250 engineers and recruiting



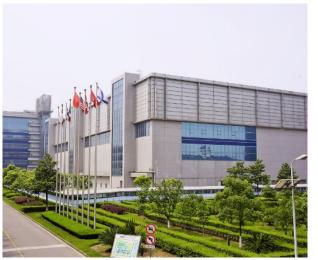
Actual wafers shipped out from Fingerprint Cards



## Scalable and efficient business model



- Fabless operation
- In cooperation with two of the global top four pure play foundries
- Dual fab qualified to secure capacity and supply for all high volume products



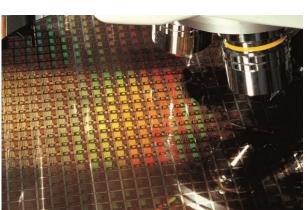


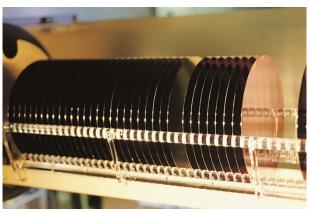
## Scalable and efficient business model



- High volumes in multiple fabs
- Flexibility and ability to quickly scale up of capacity from already high levels
- Established supplier relations
- Outsourced Semiconductor Assembly and Test partners
  - qualified by Fingerprint Cards to service Module houses

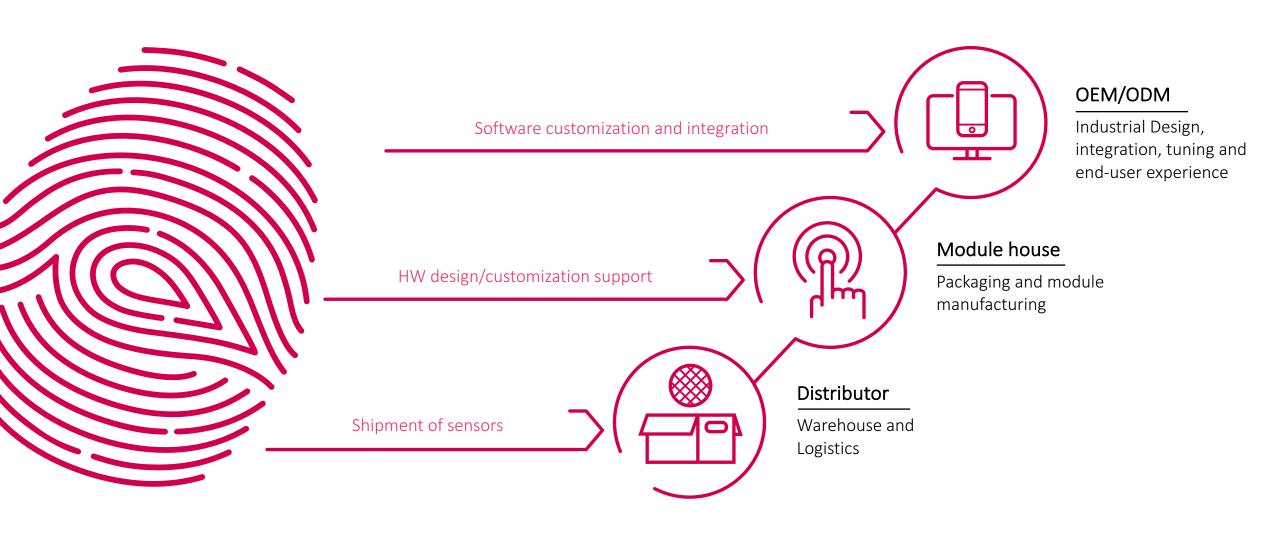








# Scalable and efficient business model





- Centralized warehouse and distribution in Hong Kong using 3PL (third-party logistics)
  - Attractive KPI: Very low Transport and Warehousing/Sales (TPW/Sales)
  - Enables flexibility and shorter lead times

>95% 100%

delivery accuracy in 2016 YTD

supply vs demand in 2016 YTD











Expanding our capabilities – in R&D, customer integration and business development

Drive sustainable, profitable growth

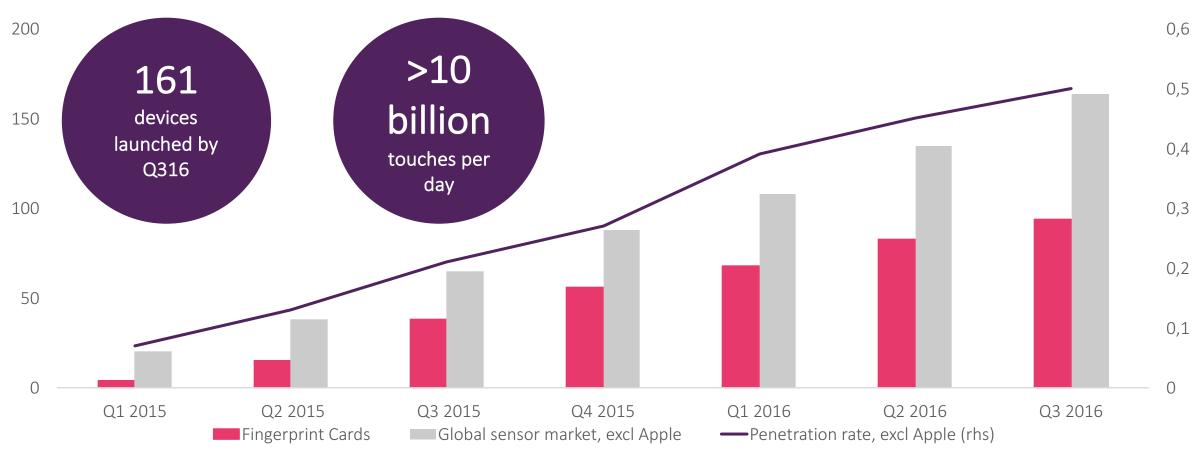


Build the backbone for efficiency and compliance

## Sustainable revenue growth



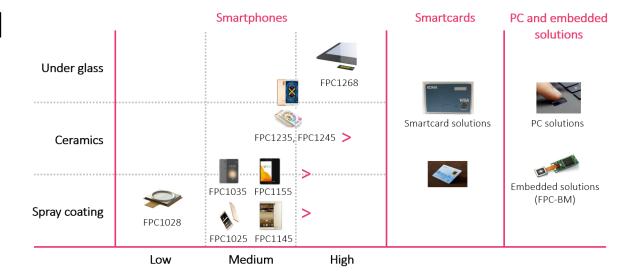




Source: Fingerprint Cards published financials and Fingerprint Cards market estimates



- Normal high tech pricing trends and dual sourcing
- Innovation differentiates
  - meeting customer requirements
  - drives customer value
  - positive impact on costs
- Distribution mode can drive scalability



## investments and profitability

- Focused investments in innovation and business development
- Profitability guidance 2017
  - At least 35% operating margin
- Reporting change in P&L in 2017
- Gross to net R&D expenditures in the P&L

#### R&D expenses and capitalization

SEK M	Tot Act 2015	Tot Acc Q3 2016
Gross R&D spend	194	249
Capitalization	-17	-57
Depreciation	29	22
Net R&D spend	205	214
Capitalization %	9%	23%

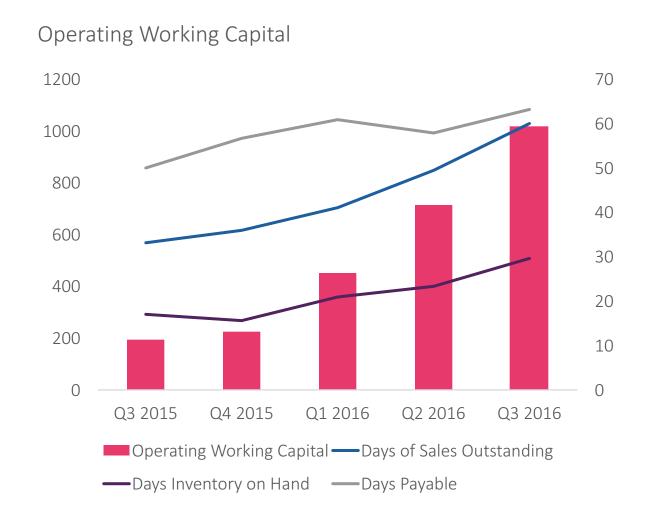
#### Profit&Loss reporting change from 2017

	Reported	Restated
SEK M	Jan-Sep 2016	Jan-Sep 2016
Revenue	5,019.6	5,019.6
Cost of goods sold	-2,569.2	-2,569.2
Gross profit	2,450.4	2,450.4
Selling expenses	-125.8	-125.8
Administrative expenses	-79.5	-79.5
Development expenditure	-191.7	-191.7
Other operating income/expenses	12.1	4.7
Operating profit /	2,065.5	2,058.1
Finance costs	0.6	8.0
Profit before tax	2,066.1	2,066.1

## Working capital and cash flow



- Efficient operating model in place
- Focus going forward
  - Long term growth more important than quarterly cash flow
  - Strong balance sheet
- Competitive working capital metrics

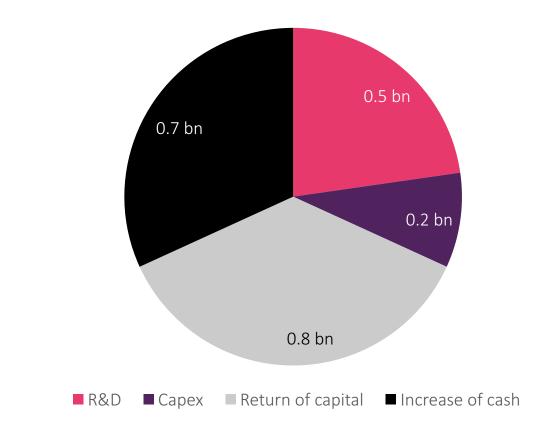


## Capital allocation and structure



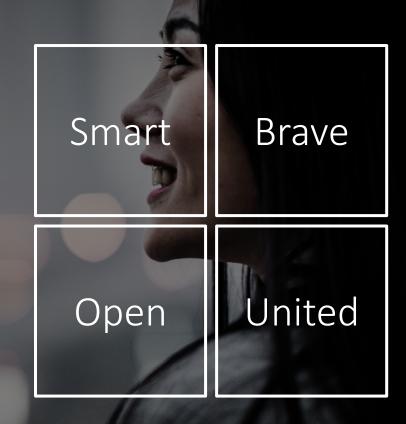
- Long term capital structure
  - Primary use of cash: long term growth opportunities
  - Strong balance sheet is essential to be a credible partner in new markets
  - Ambition to return excess capital to shareholders

Operating cash flow before R&D SEK 2.2 bn, 2014 – Q3 2016



## People and culture

- Recruit for long term growth
- Focus on our culture to attract and retain talent and motivation
- Create fundamentals for a sustainable and compliant company





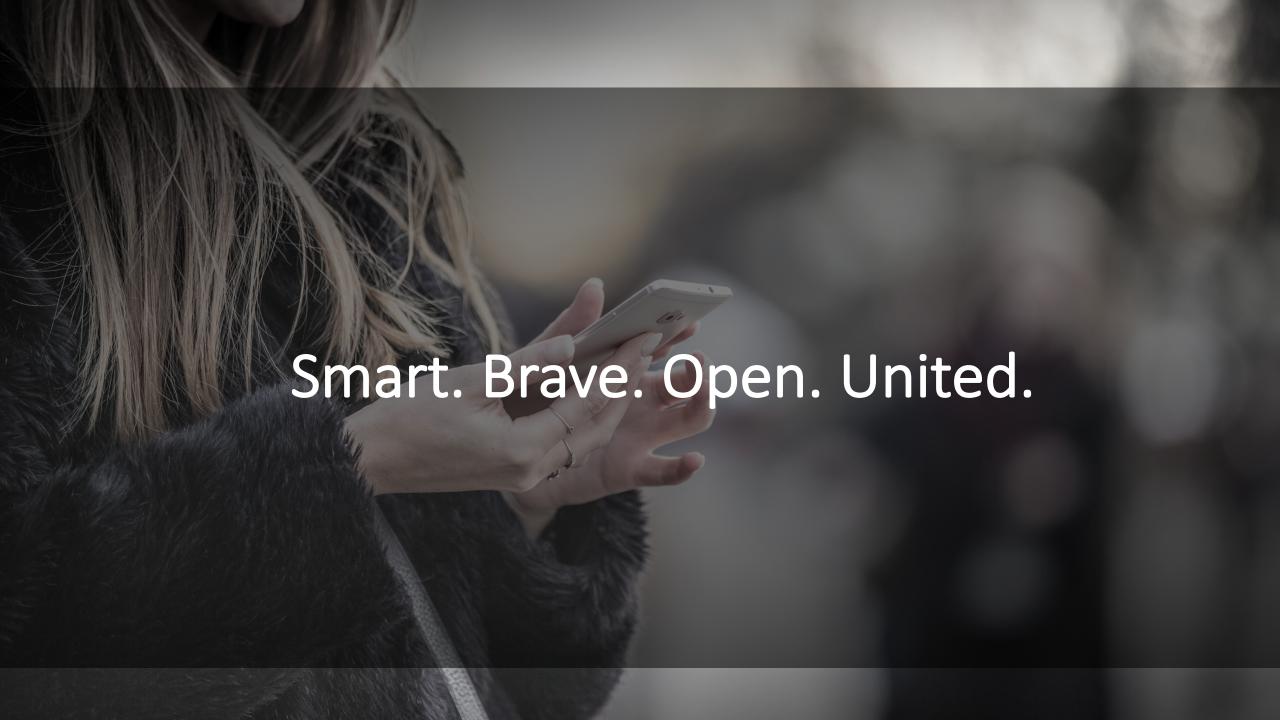
- Strong innovation focus
- Flexible delivery capacity
- Solid financials
- Continued investments for growth

# Q&A



## At the beginning of the biometrics era

- Growth continues strong potential ahead in new and existing segments
- Market leadership
- Innovation leadership
- Profitable growth



## Today's speakers





Christian Fredriksson
President & CEO



Ted Hansson Country Manager Greater China



Farzan Ghavanini Manager, Alternative Sensing Technology



Jan Johannesson
VP Strategic Planning
& Portfolio Management



Kenneth Fredriksen CEO Huawei Sweden



Jonas Spannel
Senior VP Operations
& Quality



Charles Burgeat
Head of Sales



Pontus Jägemalm Senior VP Research & Development



Johan Wilsby CFO



# Thank you for your attention!

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