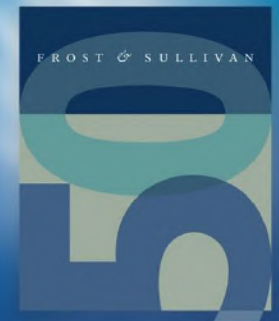


Future of Cashless Payments in Singapore

Presented by
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8 June 2018

Growing market for mobile payments in Asia-Pacific

On 11 Nov 2017...

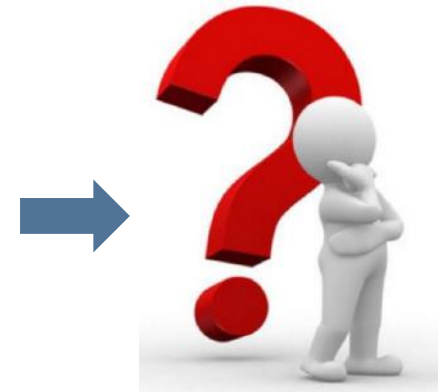


- Alibaba smashed its 2017 Single's Day record once again as sales cross SGD33 billion (RMB163.8 billion)
- **90%** of sales were made on **mobile**



- Lazada netted SGD166 million in sales across Southeast Asian markets—nearly three times of last year's performance
- **7 in 10 people** bought using their **mobile**

In the future?

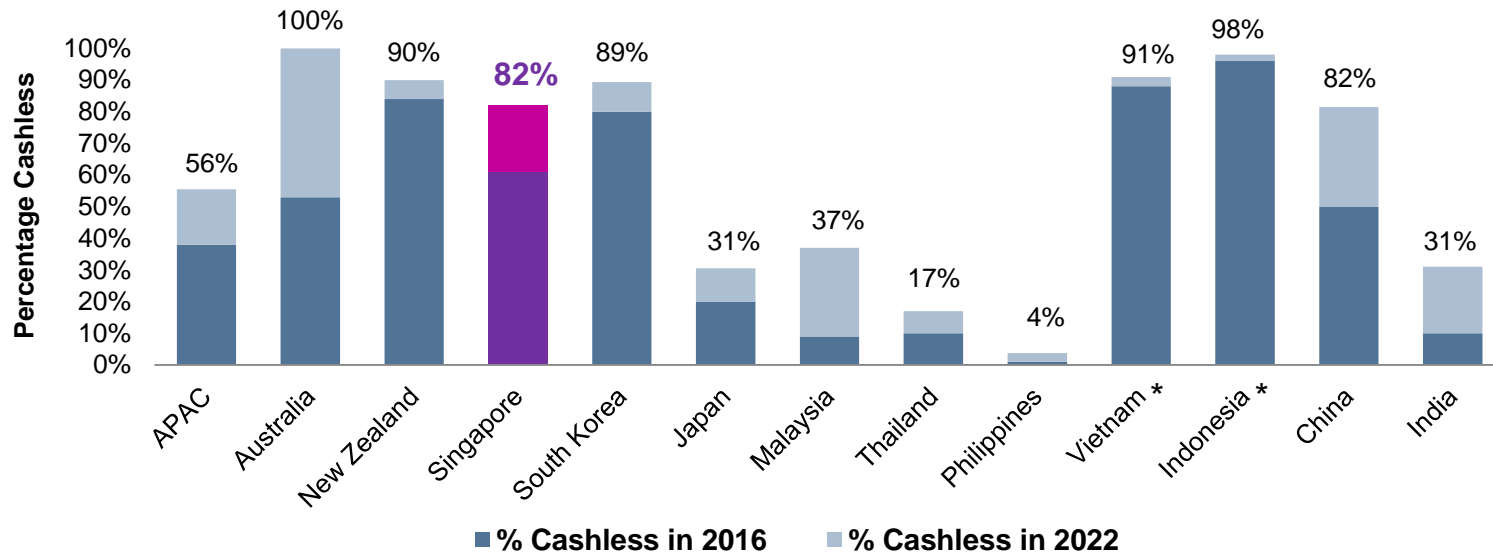


Source: Frost & Sullivan

Within Asia-Pacific, there is a shift toward “Going Cashless”

Market demand and regulatory push may result in the emergence of “Cashless Societies” 2022 onwards; mobile payment capabilities are enabling monetization of mobile Internet use

Growth in % Cashless across Asia-Pacific



Australia may be the first country in Asia-Pacific to achieve a true “Cashless Society”

Bold policy moves in populous countries such as China and India, will result in **Asia-Pacific becoming 56% cashless by 2022**

▪ **Singapore, estimated to be 61% cashless in 2016, is expected to reach 82% by 2022**

Note: *Percentages are based on volume with the exception of Vietnam and Indonesia (based on value)

Source: Frost & Sullivan

Future cashless growth trajectories in APAC skewed by heavy contribution from China and India



\$3.3 trillion
in 2016



\$50 billion
in 2016

CHINA

INDIA

45 million

2016

- Works on the latest Apple devices
- Added 1 million new customers every week in the 7 markets in 2016
- Now available in 15 countries at 20 million locations worldwide, including 4.5 million in the United States



18 million

2016

- Works on the latest Samsung phones models
- Its Knox security software is one of the best security systems for mobile devices; it now also offers iris scanning authentication
- Tied up with Alipay in May 2016



12 million

2016

- Works on all android phones, which run KitKat 4.4 or later that are NFC and HCE-enabled i.e. 70% of android phones
- Collaborates with PSPs such as Braintree and Stripe to support online mobile payments
- Offers loyalty and gift cards



- Taps on Alibaba's e-commerce base and is the world's no.1 e-wallet
- Interfaces to daily activities; stores e-coupons and loyalty cards
- Has tied up with Samsung Pay in May 2016 to access more physical stores/businesses

520 million

2017



- Taps on its social networking base as a powerful "lifestyle app"
- Allows customers to pay for products and utility bills through the social media platform without having to exit the WeChat app
- Offers a card payment option that is funded via the WeChat Wallet or a bank ATM card

700 million

2017



- Taps on India's demonetization and promotion of a cashless and digital economy
- Plans to merge its wallet business with its payments bank in 2017
- Offers diversity e.g. ticketing covers movies, airlines, train, events, and also hotel bookings

200 million

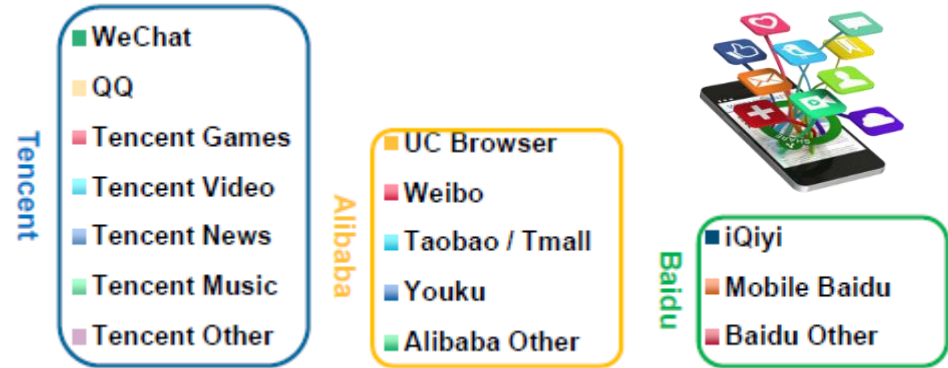
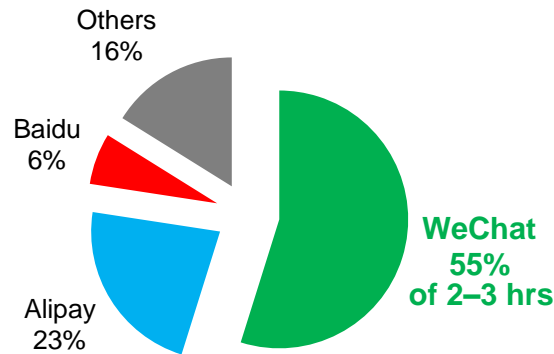
2017

Source: Frost & Sullivan

China's growth driven by a combination of WeChat's ability to become an indispensable app and introduction of mobile payments to its social media platform

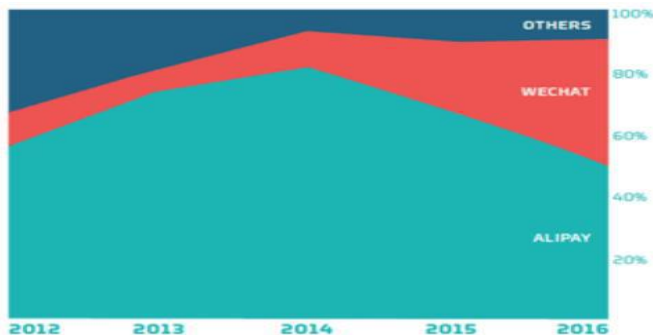
% of Time Spent on Mobile

■ WeChat ■ Alipay ■ Baidu ■ Others



- 32% of time spent on mobile purely on WeChat
- Monetization from **e-commerce** and **games**

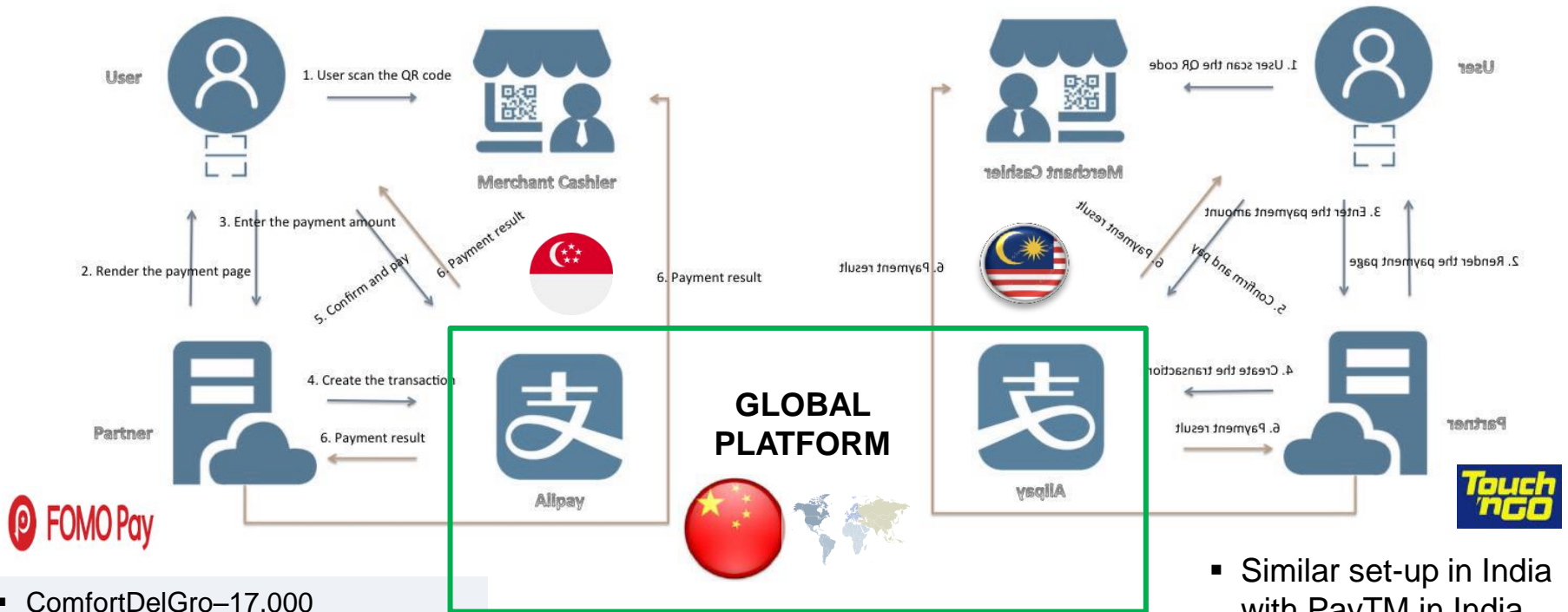
PSP Mobile Payment Market Share, China, 2011–2016



- Integration of payments into WeChat helped Tencent capture market share from Alipay and monetize mobile Internet usage
- However, as of 2017, **only 9% or 89 million of active users use WeChat outside of China**, as it is currently only official in China and Hong Kong; launching soon in Malaysia

Source: China Internet Watch, China Channel, Kleiner Perkins, Frost & Sullivan

While Alipay has been on a global expansion, its reach is still limited to Chinese tourist spots, even in Singapore



- ComfortDelGro—17,000
- Primeaxis
- 2,000 acceptance points in Chinatown, Sentosa, and Orchard Road
- Currently, Alipay users must either have a China banking account for debiting transactions or a China bank-issued credit card
- Serves only the 2.8 million tourists from China yearly

- Similar set-up in India with PayTM in India

- ✓ **Alipay is a global real-time payment platform**
- ✓ **Presence in NA, SA, EU, Africa, and APAC; however, only where Chinese tourists visit**
- ✓ **Mainly used by Chinese tourists**
- ✓ **Its investments in local partners to address local behavior, needs, and preferences, e.g. in India and Malaysia, has yet to bear fruit**

Source: Alipay, Frost & Sullivan

However, there are many supportive regional and local regulations and initiatives that will help Singapore move toward a cashless society

REGIONAL ENABLERS

- ✓ **EU GDPR**—Pressure to come from European companies that Singaporean companies are doing business with; the former are likely to start insisting that Singapore businesses implement contractual provisions
- ✓ **Mobile Biometrics**—Increasingly relevant as Europe mandates stronger customer authentication via PSD2



MasterCard has set a deadline of April 2019 for widespread use of biometric identification including fingerprint and facial recognition for its users

- ✓ **ASEAN real-time cross-border payments:** PayNet in Malaysia, ITMX in Thailand, NAPAS in Vietnam, NETS in Singapore, and Indonesia's Rintis will connect their respective payment infrastructures
 - NETS has initiated e-payment interconnectivity in small ways with India and China

LOCAL DRIVERS

MAS—SGD225 million (\$167 million) commitment in 2015 to expedite the transformation of Singapore into a Cashless Society

Infrastructure

- ✓ **SNDGO**—Better and easier ways for more businesses and consumers to connect; deployment of about 25,000 UPOS by early 2019
- ✓ **LTA**—Account-based ticketing system trial facilitated by MasterCard to allow use of contactless debit or credit cards on public transportation

Interoperability and Standardization

- ✓ **MAS** has formed the Payments Council to promote interoperability and adoption of common standards among solution providers
- ✓ **MAS** is leading formation of Fintech international collaborations
- ✓ **PayNow** simplifies the process of peer-to-peer direct funds transfer across 7 participating banks
- ✓ **SG QR (by 2018)** can accept e-payments by domestic and international payment schemes, e-wallets, and banks; PayNow via QR

Source: Frost & Sullivan

While cashless cafes have reached Singapore, only few have embraced it in Australia after 2 years; and food stalls in China are still cash dominated

DEC-17: 1st Cashless Cafe in Singapore



Ducatus Cafe, Singapore

- No cash tills
- Accepts only credit/debit cards and cryptocurrencies on Ducatus Wallet app
- Bitcoin-dispensing ATM for Ducatus coins
- Offers purchase of pre-mined 7.8 million Ducatus coins, currently trading at SGD0.13 (RM0.39) each

MAR-16 : 1st Cashless Cafe in Australia



Pablo & Rusty's Coffee Roasters, Australia

- Uses Mint mPOS connected to smartphones, tablets via bluetooth integrated with Kounta POS
- Cashless café, Frank Green SmartCup™ offering an enhanced customer experience

Despite Australia being the frontrunner of contactless, few cashless cafes as of 2017 and mobile payments only 1% of POS payments

Source: thestar, Kounta, Frost & Sullivan

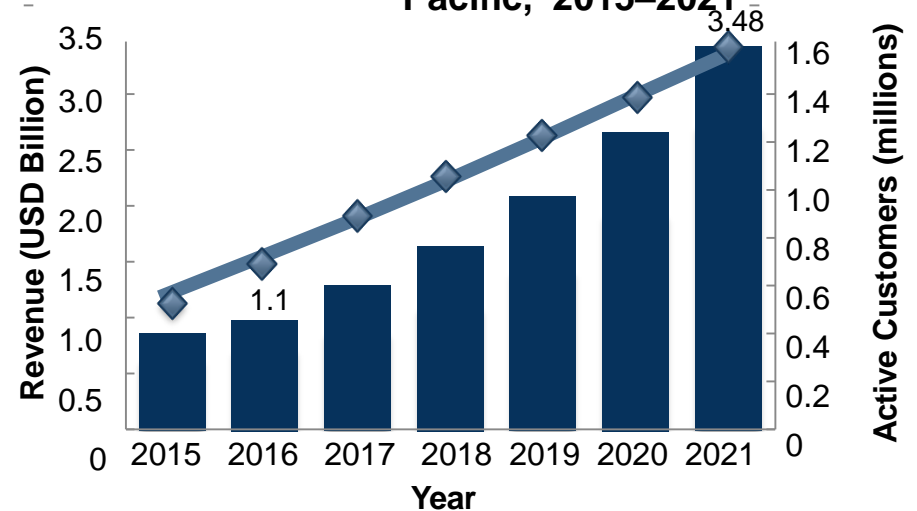
Going cashless is seen as a catalyst for the mobile payments market; mobile payments will be a key enabler of cashless societies

 **\$1.09 billion**
in 2016
SG

- The size of the mobile payments market in Singapore was estimated at **SGD1.5 billion (\$1.09 billion)**, with 23% penetration in 2016
- At the end of June 2016, Singapore had an NFC-enabled infrastructure available at **30,000** retail points.
- Singapore has the highest smartphone penetration in Asia-Pacific at 85% to support mobile payments.

It also has an optimal number of complementary mobile payment solutions needed to drive acceptance on the island state.

Total Mobile Payments Market: Asia-Pacific, 2015–2021



 **26.1%**
2016 - 2021
Revenue CAGR

 **5.9%**
2016 - 2021
Active Customer CAGR

✓ **Singapore's mobile payments market is small but growing...**



Source: Frost & Sullivan

Mobile biometrics will become an enabler of mobile payment; regionally, telcos and banks have started to embrace it for KYC and enabling innovative services



36%

Have security concerns regarding transactions made via mobile

42% would not use a mobile payment app without a biometric authentication offering, with **79%** preferring more biometric authentication methods

Know-Your-Client (KYC)

- Paperless customer onboarding by using biometric information
- Assist mobile operators to link each mobile subscription to its owner
- Reduce the chances of identity fraud during subscription process
- Identity fraud costs telcos **\$50 billion** annually

Use cases

Morpho eKYC Solution

- Allows Airtel to enable paperless customer ID registration by linking it to India's ID system, Aadhaar



Value-added Services

- Enables mobile operators to generate additional revenue along the value chain
- Faster authentication process with lower fraud risk when customers perform transactions remotely via mobile for value-added services such as mobile gaming, purchase of additional plan upgrade, music, and so on

Use cases


Qualcomm Snapdragon Sense ID

- Improves NTT DoCoMo's mobile payment function and content experience



Source: Frost & Sullivan

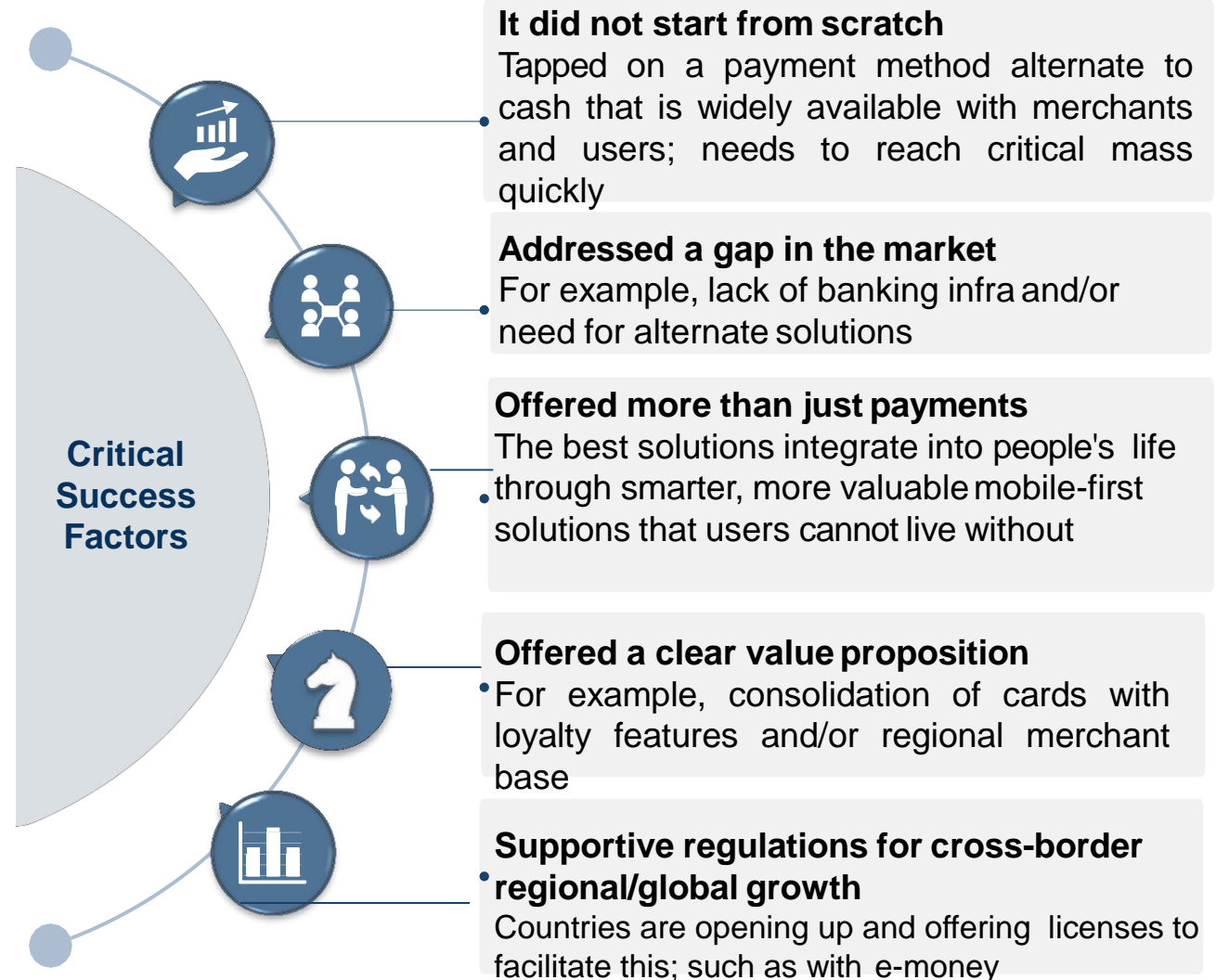
Getting the product strategy right is key to achieving scale, which in turn is critical to ensuring the viability of a payments business model


Card Interchange Rates


Regulations on Cross-border Use of E-money


NFC- & QR-based Merchant Acceptance


Comprehensive Solutions

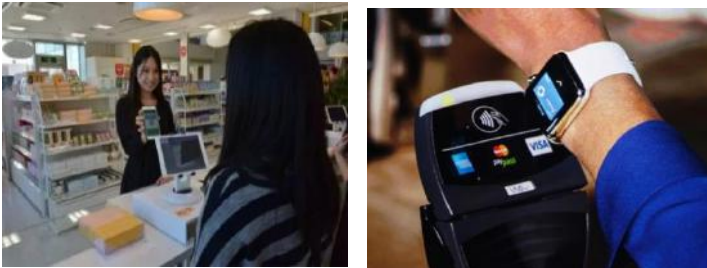


Source: Frost & Sullivan

Mobile payment solutions of today

Ideally a seamless, comprehensive solution; but not all solutions today have similar components

Payment for Offline and Online



Loyalty and Value-added Services



Document Authentication and Identity Verification Software



1. Scan front & back of credential using mobile device or scanner
 2. Images & data are processed instantly & securely in the cloud
 3. Accurate information populates your application within seconds
 4. SOV forensic tests performed on credentials in real time
 5. Optional facial recognition match, manual review & database check

Financial Services

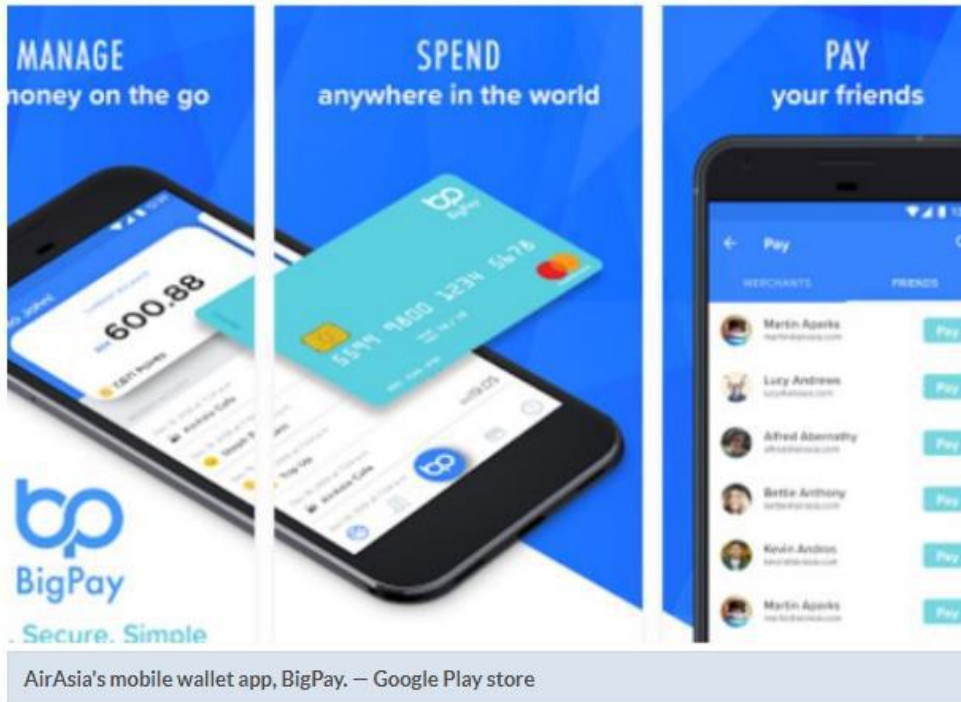


820,000+ customers in four days

Source: Frost & Sullivan

Mobile payment solutions of today (continued)

Should incentivize users in addition to making their lives easier



Offered a clear value proposition

- Will offer lower foreign exchange rates than banks
- Will offer zero processing fees when booking a flight with the airline

It did not start from scratch

- In 2016, 56.6 million passengers at group level
- Total potential within 73 million customers already in database

Addressed a gap in the market

- Working toward a “secure entry system for trusted travelers” to expedite immigration at airports within ASEAN
- To offer electronic permanent bag tag for AirAsia flyers to speed up baggage check-in

Offered more than just payments

- Will offer inflight ordering system with the option to connect up to 10 debit or credit cards to make payments across ASEAN—eases customer pain points

Source: AirAsia, Frost & Sullivan

What mobile payments in the future need to be

Global alignment is key to mobile payments going mainstream

Cash	Mobile Payments Today	Mobile Payments in Future
<ul style="list-style-type: none">• Universal acceptance: local and across APAC• Cross-border conversion possible• Customer bears full liability if lost/stolen• No value add, but can gain interest if kept in a bank	<ul style="list-style-type: none">• Fragmented acceptance: local and across APAC; The poor, rural, and so on are not well addressed• Cross-border possible for larger players; nearly impossible for small players• Has added security through tokenization and biometrics• Needs to offer value add to incentivize top-up behavior; can gain interest if cash taken from digital bank account only during transaction clearing	<ul style="list-style-type: none">• Universal acceptance: local, across APAC, and even globally• Can work cross-border and are seamless and real-time• Added security through tokenization and biometrics• E-wallet that does not need topping up as either cash is taken from the account only during transaction clearing or the credit/debit card is charged

- ✓ Scale is important; there is a need for more large market participants or for all small participants to join a platform
- ✓ Mobile payments may need to offer both NFC and QR for cross-border and universal acceptance
- ✓ **There is a need for regulatory and industry alignment across APAC and globally**

Source: Frost & Sullivan

Future of cashless payments in Singapore

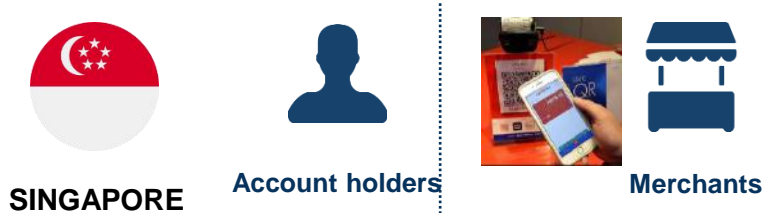
The credit card model will remain in place for years to come; what is needed is a similar model for e-money, i.e. global e-money schemes



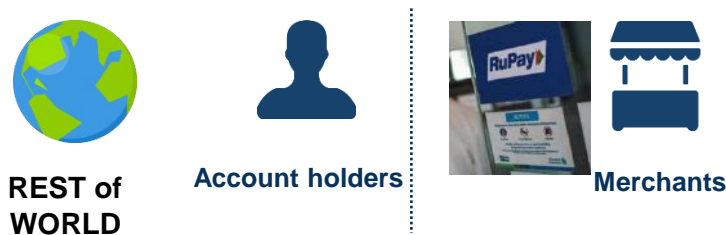
- ✓ **Credit Card is a global platform with worldwide presence**
- ✓ **However, it is used only by credit card users**
- ✓ **Innovation has only been in the Pays consolidating cards on the smartphone**

Future of cashless payments in Singapore (continued)

Potential is much more than current limited partnerships (Grab<->SG Tourism and EX-LINK<->NETS)



(Note: This is for concept illustration purposes only)



GLOBAL PLATFORM



✓ **Singapore**
(peer-to-peer direct funds transfer across 7 participating banks)

✓ **ASEAN** real-time cross border payments

✓ **Future global expansion commencing with China and India (with NPCI)**

GLOBAL SOLUTIONS



Source: Frost & Sullivan

Future of cashless payments in Singapore (continued)

Tall order but very feasible

Global first solutions with local presence and interoperability

Secure solutions incorporating tokenization, biometrics, data protection, and use of digital identities

Affordable connectivity locally and globally



Mobile payments driving cashless adoption in Singapore

To achieve this, we need more global first solution providers and local first solutions providers to partner locally, regionally, and globally with interoperability as a central theme while at the same time catering to local behavior, needs, and preferences

Source: Frost & Sullivan



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