



MOBILE PAYMENTS: Technology Forecast and Advice for Startups

Dan Liu, Deanna Schmidt and Joe Lee, MaRS Market Intelligence

For the inaugural, semi-annual Market Insights - The Brief (FinTech edition), MaRS Market Intelligence will cover one of the hottest topics in the Financial Technology cluster, and one that will likely have the most profound impact as startups and established giants alike compete to earn the trust and adoption of users: mobile payment. In this edition we will focus on developments in the proximity-based segment of the mobile payment market and provide a recap of fintech investment deals in the first nine months of 2016.



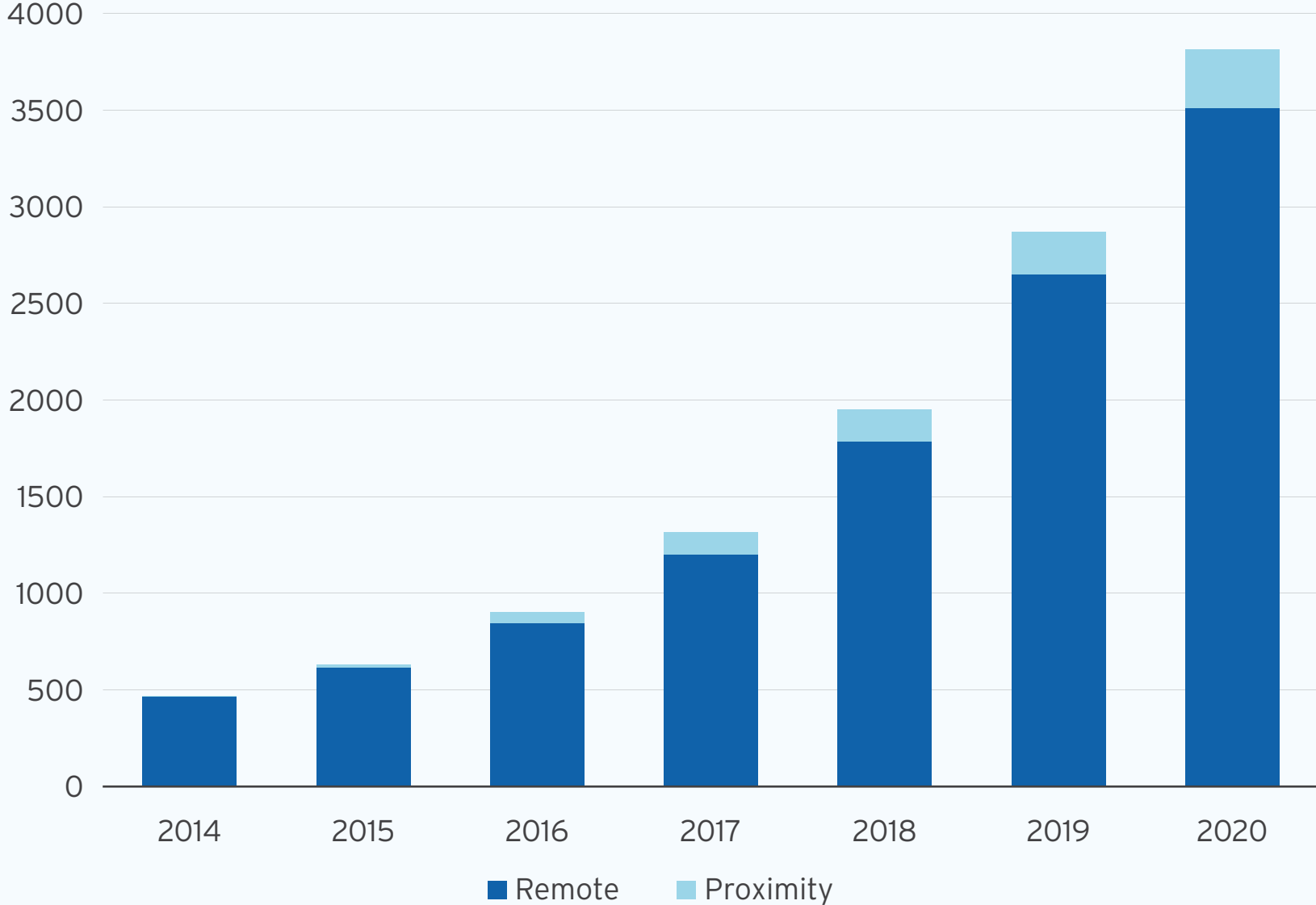
EXPONENTIAL GROWTH IN MOBILE PAYMENTS

The rise of mobile payments marks a sharp disruption to traditional banking, demanding new technology development that integrates with existing, established payment systems.

With so many players contributing to the end-user experience in payments—including payment software developers, merchants, payment networks, mobile device manufacturers, mobile network operators and banks—creating a seamless mobile payment experience for customers is a complex undertaking. The majority of mobile payments can be categorized as either remote based or proximity based. Analysts warned as recently as 2015 that many banks across the world will struggle to tackle this challenge and to compete with Apple and Alphabet/Google, which have successfully brought mobile payment options to market.¹

IDC predicts that, by 2020, total worldwide consumer mobile payments will reach \$3.814 trillion annually.²

FIGURE 1: IDC FORECAST OF WORLDWIDE CONSUMER MOBILE PAYMENTS, 2014 TO 2020 (IN US\$ BILLIONS)



Sources: IDC Financial Insights' 2014 Consumer Payments Survey; IDC's New Media Market Model, 2015

¹ Robert Smythe, Lars Goransson, Sanjay Khanna. (2015). Perspective: Banks Not Positioned to Deliver Mobile Payments' Core Functions. *IDC Financial Insights*.

² James Wester. (2015). Business Strategy: Worldwide Consumer Mobile Payments Forecast, 2015-2020. *IDC Financial Insights*.

THE CUSTOMER EXPERIENCE IMPERATIVE IN MOBILE PAYMENT

Users' full adoption and use of the technology is currently cited as one of the most prominent roadblocks to the advancement of mobile payments at point of sale.

According to IDC research associates Robert Smythe and Lars Goransson, consumer demand is simply not there: "The transition to mobile payments will only take place when consumers see that using mobile devices for payments provides them with added value and convenience beyond plastic cards."³

Perceived value and convenience are the main aspects of the overall user experience, and are therefore fundamental elements of the advancement of mobile payments. IDC cites Apple and Starbucks as examples of the value of focusing on user experience within digital payment platforms.

“Starbucks has become the leader in demonstrating how mobile payments and loyalty features can be integrated into the overall purchasing process to deliver superior client service. This type of integration has to be the goal of all mobile payment solutions providers.”⁴

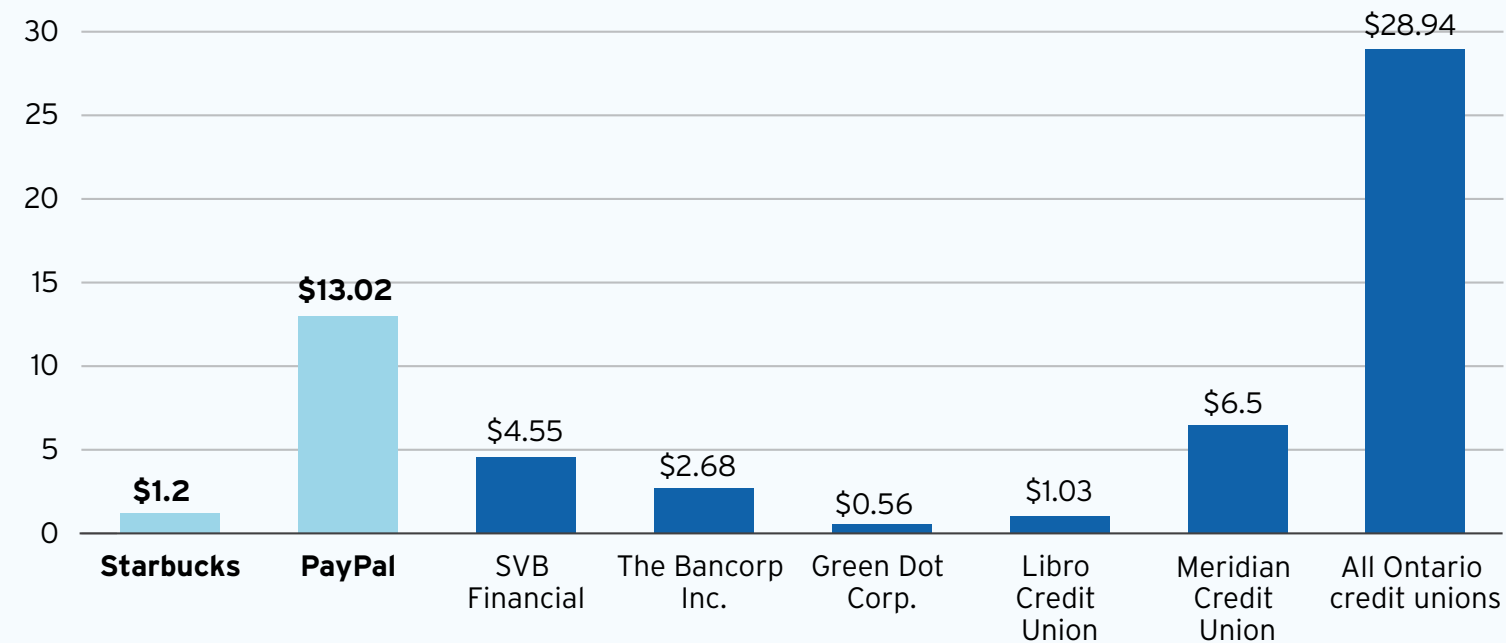
The Seattle-based coffee brand has made a name for itself within digital payments, with six million mobile orders and pay transactions processed per month in 2016, and \$1.2 billion in

consumer cash on its apps and gift cards. This begs the question: how can financial institutions similarly capture this success?⁵

Banks currently face the challenge of providing a compelling digital experience that will draw—and keep—consumers: "Competing to win customers with better digital customer experiences than the traditional banking experience, these digital banks are embracing mobile and social technologies, using digital platforms to offer simple, convenient customer experiences combined with relevant guidance and advice."⁶

Achieving perceived convenience in the eye of the customer requires seamless coordination between different partners, a quality that is not yet prominent in the relatively new market of mobile payments: "Most of the mobile payment participants are currently proceeding with independent, uncoordinated initiatives. This is reminiscent of the initial implementation of ATM services that ultimately led to the formation of Interac in Canada."⁷

FIGURE 2: COMPARISON OF DEPOSITS AT PAYPAL, STARBUCKS AND OTHER NORTH AMERICAN FINANCIAL INSTITUTIONS (IN US\$ BILLIONS)



Source: Marketwatch, WSJ, S&P Global Market Intelligence, Starbucks, Libro Credit Union, Meridian Credit Union, DICO
 Note: All Canadian financial institution deposit figures were converted from CA\$ to US\$ on November 11, 2016.

³ Robert Smythe and Lars Goransson. (2016). Business Strategy: Mobile Payments in Canada - 2016 Status Update. *IDC Financial Insights*.

⁴ Smythe and Goransson. (2016).

⁵ Tonya Garcia. (2016, June). Starbucks has more customer money on cards than many banks have in deposits. Retrieved November 1, 2016 from *MarketWatch*: <http://www.marketwatch.com/story/starbucks-has-more-customer-money-on-cards-than-many-banks-have-in-deposits-2016-06-09>

⁶ Alyson Clarke et al. (2016). Trends 2016: North American Digital Banking. *Forrester*.

⁷ Smythe and Goransson. (2016).

CANADIAN MOBILE PAYMENT LANDSCAPE IN 2017

While PayPal, Starbucks and Apple are the current mobile payment leaders in Canada, new challengers are coming soon. The net effect could be an increase in mobile payment adoption.

“Once Samsung Pay and Android Pay launch in Canada to compete with Apple Pay, you will have more usage and ubiquity among mobile (NFC) contactless transactions at the point of sale and online. Apple, Samsung and Alphabet (Google) will be the three distinct contenders,” states Dinaro Ly, director of financial technology at MaRS Discovery District.

According to the Canadian Payments Forecast 2016 by Technology Strategies International, the value of contactless payments made by consumers in Canada more than doubled in 2015, increasing by about \$30 billion (Canadian dollars) through 1.2 billion transactions.

Under that scenario, retailers and merchants will have to ask themselves some hard questions about the acceptance of Apple Pay, Samsung Pay or Android Pay. Ly believes that “business owners must continue to try and balance costs associated with [accepting mobile payment] with providing more choices for consumers to pay.”

The arrival of Android Pay in Canada could be the tipping point that turns Canada into a more mobile payments-centric country in 2017.

“Once Samsung Pay and Android Pay launch in Canada to compete with Apple Pay, you will have more usage and ubiquity among mobile (NFC) contactless transactions at the point of sale and online. Apple, Samsung and Alphabet (Google) will be the three distinct contenders”

**Dinaro Ly, director of financial technology,
MaRS Discovery District**

MOBILE PAYMENT LEADERS IN CANADA	MOBILE PAYMENT APPS USED BY MOBILE PAYMENT USERS IN CANADA IN 2016 BY GENERATION		
	MILLENNIALS (18-35)	NON-MILLENNIALS (36 OR OVER)	TOTAL
PayPal	67%	72%	70%
Starbucks	49%	35%	42%
Apple Pay	26%	25%	26%

Source: eMarketer, Catalyst Canada, “2016 Canadian Smartphone Landscape” sponsored by WPP and GroupM and conducted by Toluna, June 9, 2016

COMMUNICATION TECHNOLOGIES FOR PROXIMITY-BASED MOBILE PAYMENTS: NFC VERSUS BLE

While consumers in general are quite familiar with paying remotely through online checkouts (like PayPal) and peer-to-peer payments (like Interac e-Transfer), they are just getting used to proximity-based mobile payment options at a retail location. Regardless of the proximity-based solution, it will likely be based on either near field communication (NFC) or Bluetooth low energy (BLE) in five years.

For example, IDC predicts that NFC payments will rise from \$50.7 billion in 2016 to \$292.8 billion in 2020. (We are omitting 2D barcode-based payment technologies from this analysis.) The following is a quick summary of the key features and differences between the two technologies.

While BLE beacons are more versatile than NFC, the adoption of beacons has been slower than expected. In fact, it has been argued that the adoption of beacons has failed to materialize.⁸ According to the [2016 Future of Retail Study](#) by Walker Sands Communications, security and privacy concerns are barriers to mobile payment services, and they are largely issues tied strictly to beacons.⁹ This leaves NFC as the current leader in the battle for proximity-based mobile payments.

COMMUNICATION TECHNOLOGIES IN MOBILE PAYMENTS	NEAR FIELD COMMUNICATION (NFC)	BLUETOOTH LOW ENERGY (BLE)
How it works	NFC-enabled smart devices with proper user interface connecting to NFC payment system (including tags, control readers, etc.)	BLE-enabled smart devices with proper user interface connecting to BLE beacons
Device interactions	One-to-one	One-to-many
Range	Approximately 20 cm (practically 10 cm or less)	About 1 m to 70 m
Communications protocols	Based on existing RFID standards	Part of the Bluetooth 4.0 core specification
Accuracy	Very high (especially when within practical range)	High, but interference is possible
Security	Minimal security risks (data communication should be secured in payments by default)	Security risks around how an app engages with beacons
Privacy	Less intrusive with the potential to monitor only when NFC is engaged	More intrusive with the potential to continuously monitor devices
Popular device/service examples	Android Pay; Apple Pay; Samsung Pay	iBeacon (Apple); Eddystone (Google); AltBeacon (Radius Network)
Companies adopted/trialed technology	Canadian Tire; Chapters/Indigo; Starbucks; Tim Hortons; Uber	American Eagle Outfitters; Hudson's Bay Company (Lord and Taylor)

Sources: Beaconstac; EDN Europe; International Telecommunication Union; Lighthouse.io; Mobile Payments Today; Safari Books

⁸ Joshua Brustein. (2015). Apple's Failed Retail Revolution: Beacons Still Won't be Big on Black Friday. *Bloomberg Technology*. Available online: <http://www.bloomberg.com/news/articles/2015-11-24/apple-s-failed-retail-revolution-beacons-still-won-t-be-big-on-black-friday>

⁹ (2016). Reinventing Retail: Four Predictions for 2016 and Beyond. *Walker Sands Future of Retail 2016*. Available online: <http://www.walkersands.com/images/files/image/pdf/Walker-Sands-2016-Future-of-Retail-Four-Key-Takeaways-for-Retailers-in-2016-and-Beyond-Whitepaper.pdf>

APPLE PAY'S GLOBAL AMBITION

During its announcement of the next generation of iPhone and Apple Watch products in September, Apple confirmed the inclusion of FeliCa technology in its newest hardware.

FeliCa is a contactless payment standard developed by Sony in Japan. Initially, FeliCa “smart cards” allowed users to store tickets and passes for accessing public transit as well as e-money, an electronic form of currency. E-money eventually became a prevalent payment option that was accepted everywhere, from convenience stores to cafés to vending machines. Mobile FeliCa, commonly called Osaifu-Keitai (which translates to “wallet-cellphone”), was later developed as a hybrid technology for smartphones in partnership with NTT DoCoMo, a leading cellular provider in Japan.

According to the Bank of Japan, there are 1.9 million FeliCa-enabled payment terminals in the country, which handled transactions totalling 4.6 trillion yen (\$46 billion) last year (Bloomberg).¹⁰ Comparatively, it was reported that there were 1.3 million NFC terminals in the United States and 320,000 in the United Kingdom last year. Therefore, Japan represents a significant market for Apple Pay’s revenue opportunity.

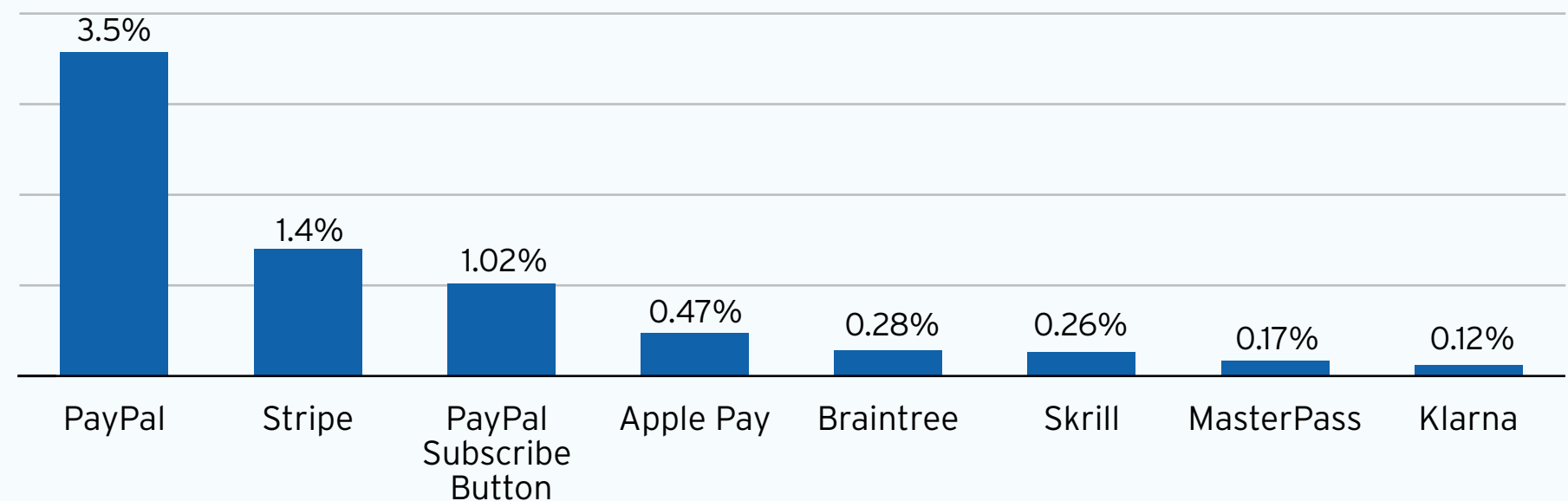
Working closely with transit operators, Apple launched FeliCa-enabled Apple Pay services in October 2016 for commuters. Unfortunately, the launch did not go as smoothly as the company had hoped, as users experienced disruptions lasting several hours.¹¹ The problem was a higher than expected volume of usage that caused server overload.

Growing pains with any new products or services can certainly be expected, even with Apple.

According to Jennifer Bailey, the head of Apple Pay, the service has enrolled one million users in just six weeks after launch.¹² Apple’s plan to use transit payment as a gateway for users to become more comfortable in adopting Apple Pay service in Japan seems to be paying off. Elsewhere, Apple continues to expand its payments service beyond proximity. According to payments analytics from SimilarTech, Apple Pay is now the fourth most popular payment technology among the top 10,000 sites.

During Apple CEO Tim Cook’s recent visit to Japan he told a reporter that he would like [Apple] “to be a catalyst for taking cash out of the system.”¹³ This is a particularly ambitious goal, as Japan’s economy, like many others in Asia, is still very much driven by cash transactions.

FIGURE 3: TOP PAYMENT TECHNOLOGIES AMONG TOP 10K SITES (AS OF DECEMBER 12, 2016)



Source: SimilarTech

¹⁰ Mark Gurman and Gareth Allan. (2016). Apple Plans iPhone for Japan with Tap-to-Pay for Subways. *Bloomberg Technology*. Available online: <http://www.bloomberg.com/news/articles/2016-08-25/apple-said-to-plan-iphone-for-japan-with-tap-to-pay-for-subways>

¹¹ Pavel Alpeyev and Gareth Allan. (2016). Apple Pay Has Rocky Debut in Japan as Commuters Hit Snags. *Bloomberg Technology*. Available online: <https://www.bloomberg.com/news/articles/2016-10-25/apple-pay-japan-debut-hit-by-problems-as-rail-commuters-struggle>

¹² Mikey Campbell (2016). Apple Pay now accepted at 35% of US merchants, coming to Gap and more in 2017. Available online: <http://appleinsider.com/articles/16/12/06/apple-pay-now-accepted-at-35-of-us-merchants-coming-to-gap-and-more-in-2017>

¹³ Waichi Sekiguchi. (2016). Apple CEO says iPhone's future is in AI. *Nikkei*. Available online: <http://asia.nikkei.com/Business/Companies/Apple-CEO-says-iPhone-s-future-is-in-AI>

IT'S YOUR MOVE, CANADIAN FINTECH STARTUPS

According to IDC's Business Strategy: Mobile Payments in Canada - 2016 Status Update, new entrants can find success by focusing on the following three key themes:

- understanding and accessing the Canadian payments ecosystem through innovative thinking and ability;
- looking to payment networks for assistance in offering payment services; and
- adding value to merchants through payment, loyalty and merchandising solutions.

Additional opportunities might be present for mobile payment technologies to partner with smartphone companies (that are lagging on their mobile payment/wallet initiatives) to address the mutual focus on user experience and, by extension, with banks and other emerging technologies such as biometric companies.

The smartphone market within Canada has, for example, reached maturity and continues to see modest growth that is driven by consumers transitioning to new devices upon signing new contracts.¹⁴ Such crowded markets demand new approaches to product development and marketing: "Vendors need to pay closer attention to points of differentiation and value, and they need to start crafting marketing campaigns that break through the clutter and elevate their products in Canadian consumers' minds."¹⁵

This will not be a solely Canadian phenomenon as many parts of the world reach the throes of the once-in-a-lifetime smartphone boom. Aside from smartphone leaders like Apple and Samsung, tech unicorn [Xiaomi](#) announced [Mi Pay](#) in September 2016 in an attempt to further differentiate itself from the pack.

That said, Ly thinks that it will be a difficult task for startups to profit from cash displacement, even though the trend is firmly in place. According to the Canadian Payments Association, cash is the only payment method in decline in the point-of-sale environments since 2008. [Recent Moneris research](#) found that, by 2030, only 10% of money spent in Canada will be cash purchases. To avoid direct competition with tech giants like Apple, Samsung or Google, startups should focus on finding a niche and differentiating their products/services.

"Startups need to pick a few of those themes and really punch above their weight to differentiate themselves from the giants. For example, Mobeewave and SelfPay are two startups that are actually helping to drive the displacement of cash in Canada," advises Ly.

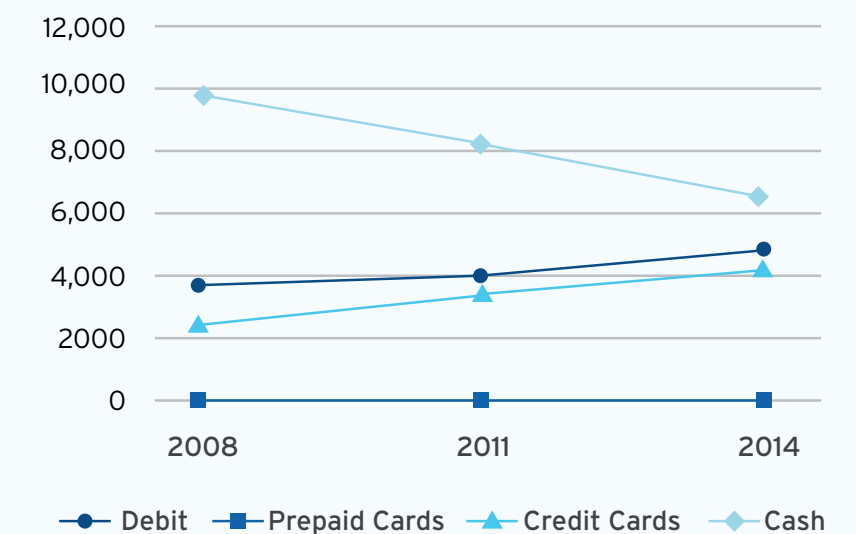
SUMMARY OF VC-BACKED FINTECH ACTIVITIES IN CANADA AND NORTH AMERICA

The Canadian fintech scene is not immune to a potential slowdown in global fintech investment activities due to economic or political uncertainties and concerns with valuation.¹⁶ Forrester analyst Oliwia Berdak concluded recently that not many fintech unicorns can live up to their inflated valuations.¹⁷ However, while 2016 Canadian fintech venture capital (VC) investment activities decreased on a quarter-to-quarter basis (from Q1 to Q2 and from Q2 to Q3), the first half of 2016 was the best six-month stretch over the past two years. There were 11 VC deals in Canada, totalling \$88.8 million, with more than 55% of investment occurring in the first quarter of this year. This translates into approximately 4% of total fintech investment in North America (US and Canada). North American fintech ventures raised \$3.04 billion through 209 deals in the first half of 2016.

“Fintech unicorns have proliferated. Now investors are asking how many of these firms can live up to their inflated valuations. Their conclusion: not many. As a result, markdowns and stock-price collapses have begun.”

Oliwia Berdak, Senior Analyst at Forrester Research

FIGURE 4: POINT-OF-SALE TRANSACTION VOLUME BY PAYMENT METHOD, 2008 TO 2014 (IN MILLIONS)



Source: Canadian Payments Association

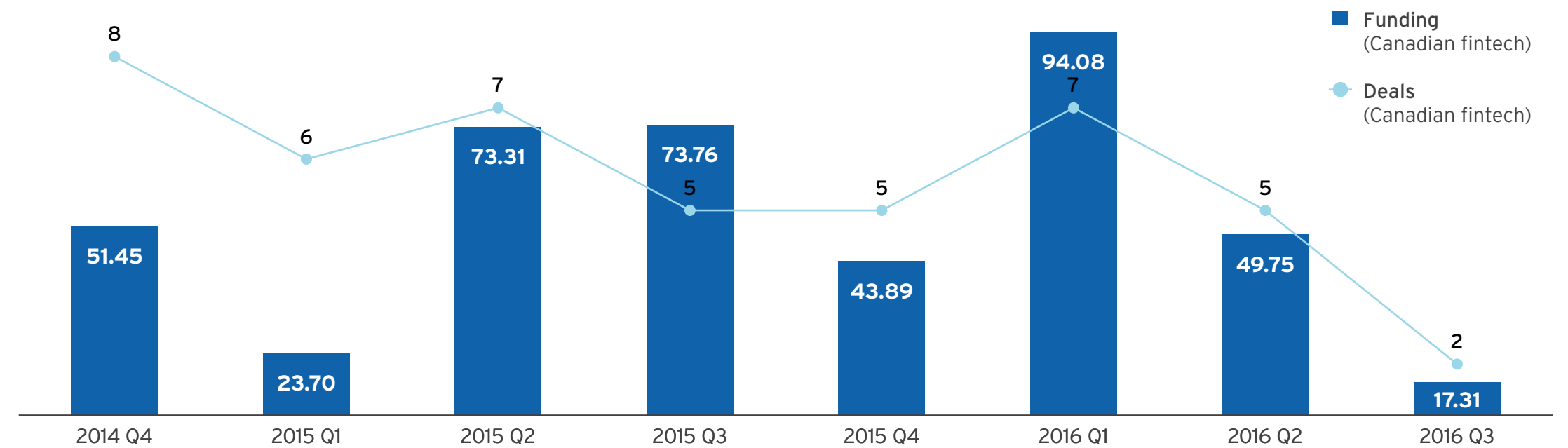
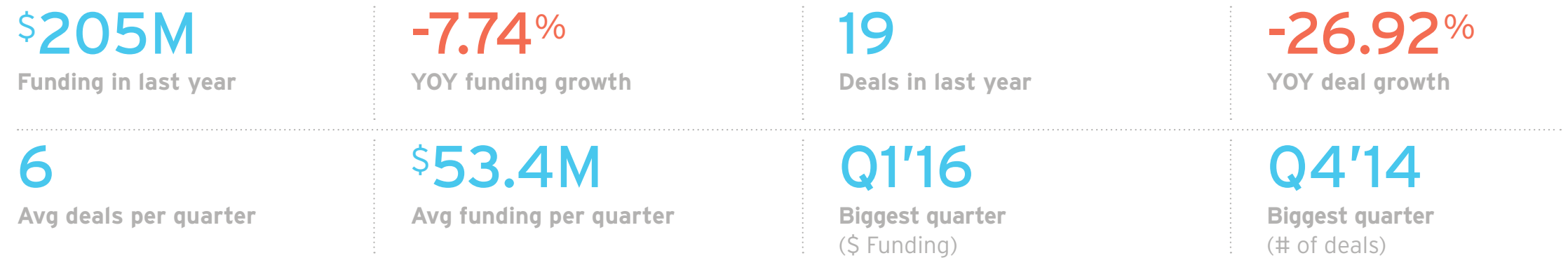
¹⁴ Sanjay Khanna et al. (2015). IDC. Canadian Mobile Device Forecast 2015-2019.

¹⁵ Khanna. (2015).

¹⁶ KPMG. (2016). The Pulse of Fintech, Q2 2016.

¹⁷ Oliwia Berdak. (2016). The Wounded Unicorns of Fintech. Forrester.

**FIGURE 5:
CANADIAN FINTECH
DEALFLOW, 2014 Q4
TO 2016 Q3
(IN US\$ MILLIONS)**



COMPANY	STAGE	AMOUNT RAISED	TOTAL FUNDING RECEIVED
Blockstream (blockstream.com)	Series A	\$55M	\$76M
LEAGUE (league.com)	Series A	\$25M	\$29M
eSentire (esentire.com)	Series D	\$19.5M	\$40.9M
Bench Accounting (bench.co)	Series B	\$16M	\$26.2M
Lendful (lendful.ca)	Series A	\$10.66M	\$10.7M
Overbond (overbond.com)	Seed	\$7.5M	\$7.5M
Wave (waveapps.com)	Series C - III	\$6.7M	\$47.5M
LemonStand eCommerce (lemonstand.com)	Seed VC	\$1.25M	\$1.26M

Source: CB Insights

FIGURE 6:
NORTH AMERICAN
FINTECH
DEALFLOW, 2014
Q4 TO 2016 Q3
(IN US\$ MILLIONS)

\$5.06bn

Funding in last year

-39.19%

YOY funding growth

343

Deals in last year

-17.75%

YOY deal growth

95

Avg deals per quarter

\$1.67bn

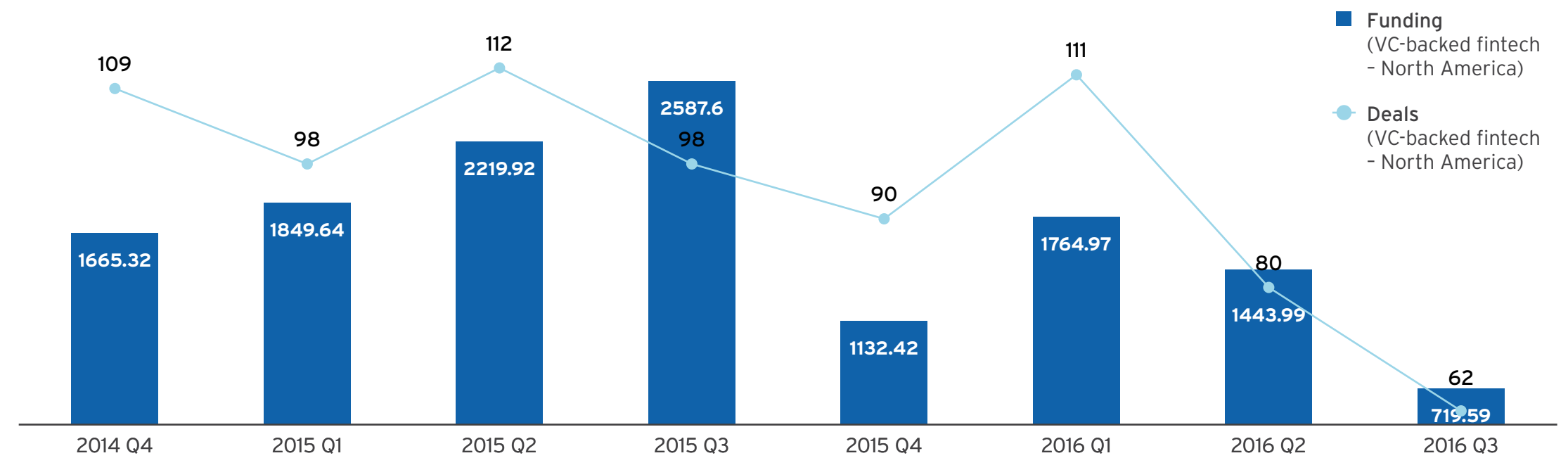
Avg funding per quarter

Q3'15

Biggest quarter
(\$ Funding)

Q2'15

Biggest quarter
(# of deals)



COMPANY	STAGE	AMOUNT RAISED	TOTAL FUNDING RECEIVED	VALUATION
Oscar Health Insurance Co. (hioscar.com)	Series C	\$400M	\$727.5M	\$2.7bn
Clover Health (cloverhealth.com)	Series C	\$160M	\$295M	
Affirm (affirm.com)	Series C	\$100M	\$425M	\$700M - 800M
Betterment (betterment.com)	Series E	\$100M	\$205M	\$700M
Bright Health (brighthealthplan.com)	Series A	\$80M	\$80M	
Personal Capital (personalcapital.com)	Series E	\$75M	\$182M	\$500M
Circle Internet Financial (circle.com)	Series D	\$60M	\$136M	\$400M
Digital Asset Holdings (digitalasset.com)	Series A	\$60M	\$67.1M	\$100M

Source: CB Insights

TOP VENTURE CAPITALISTS IN FINTECH IN 2015

The following list, compiled by MaRS Market Intelligence, provides an overview of the most active venture capital firms in fintech from 2015.

TOP ACTIVE VENTURE CAPITALISTS IN FINTECH IN LAST YEAR

RANK	CANADA	RANK	GLOBAL
1	BDC Venture Capital	1	500 Startups
2	OMERS Ventures	2	General Catalyst Partners
2	Real Ventures	2	QED Investors
3	Bain Capital Ventures	3	Bain Capital Ventures
3	Blumberg Capital	3	FundersClub
3	Accel Partners	4	Blumberg Capital
3	American Express Ventures	4	Khosla Ventures
		4	New Enterprise Associates
		5	Nyca Partners
		5	Sequoia Capital India
		5	Spark Capital

RANK	NORTH AMERICA
1	General Catalyst Partners
2	Bain Capital Ventures
3	FundersClub
4	Khosla Ventures
4	Nyca Partners
4	QED Investors
5	First Round Capital
5	Blumberg Capital
5	New Enterprise Associates
5	Social Capital
5	Spark Capital

Sources: CB Insights; MaRS Market Intelligence

In 2015, BDC Venture Capital made the most fintech deals in Canada, while General Catalyst Partners made the most fintech deals in North America. Globally, 500 startups made the most fintech deals in 2015. It is interesting to note that the majority of these VCs are headquartered in North America—perhaps you do not have to travel far to secure your next round of funding.

Reading list of fintech startup executives

1. Do you need to understand all things payment? Capgemini and the Royal Bank of Scotland have a collection of reports and data just for you. Please go to: <https://www.worldpaymentsreport.com>
2. How are regulators at Financial Consumer Agency of Canada informing themselves of mobile payments? This report from their Research Division may shed some light. Please go to: <http://www.fcac-acfc.gc.ca/Eng/resources/researchSurveys/Documents/InternationalReviewMobilePaymentsAndConsumerProtection.pdf>
3. Bloomberg View columnist and well-known market commentator Barry Ritholtz asked if fintech and the robo-advisor movement will bring an end to

wealth management as we know it. He thinks the following report holds some critical answers. Please go to: <http://www.ftpartners.com/docs/FTPartnersResearch-DigitalWealthManagement.pdf>

How MaRS Market Intelligence can help fintech companies

1. Are you part of an early-stage company in the fintech cluster? If your startup has less than \$1 million in revenue and less than \$5 million in funding, you might qualify for access to fintech reports in our Market Intelligence database library. These reports could help fill some data gaps in your pitch deck! Please speak with your advisor and learn more here: <https://www.marsdd.com/market-intelligence>
2. Did you know that, as part of the MaRS Growth program, you might be eligible for custom market research services from MaRS Market Intelligence? We provide research-based consultancy in a short-term engagement. If you are interested in participating in our custom services pilot program, please ask your advisor for a referral.

A hand holding a smartphone over a payment terminal, with a blue overlay.

MOBILE PAYMENTS: TECHNOLOGY FORECAST AND ADVICE FOR STARTUPS

Dan Liu, Deanna Schmidt and Joe Lee, MaRS Market Intelligence

MaRS Discovery District
marsdd.com/fintech
101 College Street, Suite 230 Toronto, ON