Future Freak
Techs & Trends Transforming Banking

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- Develops actionable insight and strategy for the financial services industry
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- Technology Faculty Chair for several graduate schools of banking
- Authors articles for industry trades
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Agenda

• The Unicorn Stampede
  • Fintech, startups and disruption?
  • “Fintechgration”

• The Future Freaks
  – Techs Transforming Lending & Payments
  – Techs Transforming Financial Services

• Emerging Risks
  – Mobile, Payments, Lending Risks
  – Strategic & Co-Innovation Risks
Cost of founding a digital startup dropped from $5M in 2000 to $5K in 2013. --Celent
The $12B in fintech venture is still small compared to the $200B banks spend on tech each year.
The great unbundling of banking?
Digital Creates Silent Churn

1. Generic **just-good-enough** digital banking commoditizes financial products and services

2. Customers begin shopping banks on **price only**

3. While community banks may hold the checking account, many **customers turn to secondary FIs** for profitable credit cards, mortgages, and other loans.

4. Community banks become **primary in name only**.

SOURCE: Javelin’s “Bank Switching: Combating ‘Silent Churn’ to Maximize Primary FI Status”; November 2015
Primary vs. Secondary Relationships

SOURCE: Javelin’s “Bank Switching: Combating ‘Silent Churn’ to Maximize Primary FI Status”; November 2015
Checking Accounts vs. Credit Products

SOURCE: Javelin’s “Bank Switching: Combating ‘Silent Churn' to Maximize Primary FI Status”; November 2015
What’s the Big Deal? Threats to Banks

• Siphoning most strategic and profitable customer segments
  – Higher income (Moneyhawks)
  – Younger (Gen Y1 and Gen Y2)
  – Small Businesses
• Bank reduced to passive funding source
  – 3rd-party mobile wallets
• Complete disintermediation of the bank
  – Merchant wallets, mobile order/pay ahead, and BOLPUIS
The great re-bundling of banking?
(a.k.a. API Banking)
(a.k.a. Fintechgration)
The Great Re-Bundling of Banking?

• Fintech vendors creating middleware platforms that integrate spot solutions using APIs, expedite evolution of digital channels, enable mobile-first services, and improve user experience (UX)
  – Jack Henry & Symitar
    • Jxchange, SymXchange & Banno Platform
  – Fiserv
    • Enterprise Services Framework
  – BackBase, D3, etc.
Alternative Lending
Alternative Lending Providers

Despite the hype, **P2P lending** makes us less than 1% of total credit card debt in the U.S.
Lending Club’s $834M IPO

In 2016, regulatory scrutiny, investor sobriety, and stiff competition from FIs will slow alternative lending growth.
Harness the Alternative Lender Market?
Payments
“Disruption” in Payments?

Digital Wallets
- Mostly “wrapper” services, with a direct link to a bank issued funding source (usually, a card)
- Main impact on relationships, branding, availability of data
- Potential revenue loss due to aggregation of transactions or non-card funding sources (e.g. ACH)

Modern Wallet Services
- The rise of alternative payments opened the doors for PSPs and other non-banks to enter the market
- Focus on segments historically under-served by banks (e.g. SME)
- Some services are arguably beneficial to banks (e.g. growing cards acceptance)
- Threat is less directly in payments, more to the broader banking relationship (e.g. lending)

Money Transfer (Domestic & International)
- Domestically, in developed markets, focused on making it easier (e.g. phone number/ email based) and faster. In developing markets, it’s about helping create financial infrastructure and financial inclusion
- Internationally, attacking banking services which are often seen as too expensive and too slow

Source: Celent’s “BANKS, RETAILERS, AND FINTECH: REIMAGINING PAYMENTS RELATIONSHIPS PART THREE: THE FINTECH PERSPECTIVE” Zilvinas Bareisis and Gareth Lodge; January 2016; Stephen Greer; November 2015
So far, disruption in payments has been overstated.

- Mostly “wrapper” services, with a direct link to a bank issued funding source (usually, a card)
- Main impact on relationships, branding, availability of data
- Potential revenue loss due to aggregation of transactions or non-card funding sources (e.g. ACH)

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Evolution of Payments

Mobile

Digital

Invisible
Q: What’s the **biggest hassle** consumers face paying for things in a store?

A: **Standing in line** waiting to pay for things in a store.
STARBUCKS COFFEE®

Mobile Order & Pay Ahead

Order from your phone, pickup at your store.

SIGN UP
SIGN IN
Why did Starbucks create a mobile app?
Breakage
$4B put on Starbucks gift cards last year
You don’t have enough on your card.
What the customer hears and feels...
You’re too poor to buy coffee here.
user experience

noun  the totality of emotions evoked in a customer when he/she connects with the bank—and not just the interface.
emotional intelligence

noun

skill in perceiving, understanding, and managing emotions and feelings.
UI ➔ UX ➔ engagement ➔ trust
Why will Emotional IQ only become more important?
Wearables, sensors and monitors will ultimately gauge consumer emotions ...literally.
What if you could make user experiences better by knowing your customers’ emotional reactions?

EMOTION AS A SERVICE


LEARN MORE
...back to payments.
BOLPUIS

Buy Online Pick Up In Store
The disappearance of POS payments will challenge issuers and their wallets.
FACT: Consumers spend 5 hours 38 minutes online each day. (Pew Research)

Q: What percentage of that online time is spent shopping? 2%
Social Media “Buy Buttons”
Turns out you need interest and intent.
Contextual Commerce 2.0
Place it.
You can hang or stick Dash Button using a removable loop or reusable, washable adhesive on the back.

Press it.
When you are running low on your favorite products, simply press Dash Button and look for a green light.

Get it.
Once you see the green light, your order is placed automatically and delivered to your front door.
INTRODUCING
amazon echo

Always ready, connected, and fast. Just ask.
Contextual Commerce 3.0
...interest, intent, and ability to buy!
Moven

MOVEN BALANCE $370.26

You're in the GREEN

You are below your average spend by $871.

All Accounts

You've spent as of Tue May 28 $3,681

Your average to date is $3,971

You are below your typical $200
Mobile banking and shopping converge:

- **63%** of mobile banking users have **checked** their account balances on their phones before making a large purchase

- **53%** decided not to purchase an item as a result of their account balance or credit limit

*SOURCE: Federal Reserve’s 2015 Consumers and Mobile Financial Services Report*
What about faster payments?
What is the fastest, free way to send money in the U.S. today?
Faster Payments?

- Fragmented approaches will eventually converge
  - Fed joins NACHA Same-Day ACH bandwagon rolling out September 2016
  - Early Warning acquires clearXchange
  - FIS PayNet partners with The Clearing House
- These approaches aren’t ubiquitous…yet
  - NACHA’s ACH Same-Day Settlement; The Clearing House’s Real-Time Payments Initiative; MasterCard Send
- Immediate notification more important than immediate settlement.
- What about virtual currencies?
  - Bitcoin, RippleLabs, etc.
• Internet of Information
• Internet of Things
• Internet of Value
Blockchain Investments

- Clearing & Settlement
- Institutional Banking
- Peer-to-peer applications
- Smart Contract
- Proof of Concept
- Security & Safety
- International Payments
- Secure Trading

Banks Investing in Blockchain Technology

- Wells Fargo
- Bank of America
- J.P. Morgan
- Citibank
- Goldman Sachs
- Santander
- ING
- BBVA
- Nordea
- US Bank
- Commerzbank
- UBS
- Barclays
- Commonwealth Bank
- Morgan Stanley
- Westpac
- RBS
- The Royal Bank of Scotland
- SMBC
- Credit Suisse
- Deutsche Bank
- HSBC
- Commonwealth Bank
- Morgan Stanley
- MUFG
- National Australia Bank
- Nomura
- BNP Paribas
- Mizuho
- Société Générale
- TD Bank
- Danske Bank
- State Street
- UniCredit Group
- OP Suur-Savo
- BNY Mellon
- Northern Trust
- CIBC
- BMO Financial Group
Distributed ledgers could/might maybe change everything.
“...transfers facilitated by central authorities such as FIs and clearinghouses has not changed in the last 150 years. Distributed ledger technology can eliminate the need for that trusted middleman.”

Blockchain is a distributed ledger

Figure 1 Centralized, Decentralized and Distributed Systems (Paul Baran, 1964)
Blockchain is a protocol...

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCP/IP &amp; SMTP</td>
<td>Email</td>
</tr>
<tr>
<td>TCP/IP &amp; HTTP</td>
<td>Web browser</td>
</tr>
<tr>
<td>TCP/IP &amp; VoIP</td>
<td>Skype &amp; FaceTime</td>
</tr>
<tr>
<td>Distributed Ledgers (Blockchains)</td>
<td>Bitcoin, NASDAQ Pre-IPO private stock exchange, etc.</td>
</tr>
</tbody>
</table>
Blockchain

Block 51
Proof of work: 0000009857vvv
Previous block: 000000432qrza1

- Transaction lk54lfvx
- Transaction 09345w1d
- Transaction vc4232v32

Block 52
Proof of work: 000000zzxvzx5
Previous block: 0000009857vvv

- Transaction dd5g31bm
- Transaction 22qxs987
- Transaction 001hk009

Block 53
Proof of work: 00000090b41bx
Previous block: 000000zzxvzx5

- Transaction 94lxcv14
- Transaction abb7bxxq
- Transaction 34oiu98a

Block 54
Proof of work: 000000jjl93xq49
Previous block: 00000090b41bx

- Transaction 555lbj4j12
- Transaction bn24xa0201
- Alice -> Bob
SIMPLIFIED BLOCKCHAIN INFRASTRUCTURE

PRIVATE BLOCKCHAIN
High transaction volume and low latency

ASSET MANAGEMENT
Real assets: commodities, currencies, and equities

SECURITY
Secure transaction management and authorization

INTEGRATION
Developer tools and APIs

Blockchain as a Service
Private / hosted | Digital assets | Shared ledgers
The first consensus-based ledger system exclusively for financial institutions.

**Shorter Settlement Times**
Decreases counterparty risks taken on by financial institutions

**Immutable Record Keeping**
Reduces time spent on lengthy audit processes

**Streamlined Back-Office Operations**
Automation eliminates many manual tasks required for post-trade clearing and settlement

**Highest Level of Security**
Built from the ground up using established cryptographic standards and best practices

**Significant Cost-Savings**
Unlocks fresh capital typically tied up in expensive clearing and settlement systems
Blockchain: Will It Matter for Banks?

• “…faster, cheaper and more secure/transparent way to manipulate money electronically…”

• “…financial services face the most immediate threat.”
  – But layers of infrastructure must be built first, and consumers and regulators must be persuaded to trust blockchain—two prerequisites that give incumbents an early edge.

• “…shortened settlement time also reduces the risk of fraud. Shared ledger technology could even curb the current epidemic of identity theft.”
  – Applications: payments; title insurance; buying/selling a house; buying/selling stocks; corporate syndicated loans and trades; private stock and repurchase agreements

Mobile wallet ecosystem is fragmenting in 2016...
# Mobile Wallet Fragmentation

<table>
<thead>
<tr>
<th>Feature</th>
<th>Apple Pay</th>
<th>Android Pay</th>
<th>Samsung Pay</th>
<th>PayPal</th>
<th>CurrentPay</th>
<th>CapitalOne</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Launch</strong></td>
<td>September 2014</td>
<td>September 2015</td>
<td>September 2015</td>
<td>Summer 2016</td>
<td>2016</td>
<td>October 2015</td>
</tr>
<tr>
<td><strong>Channels</strong></td>
<td>In-app, In-store</td>
<td>In-app, In-store</td>
<td>In-app, In-store</td>
<td>In-app, In-store, Online</td>
<td>In-app, In-store, Online</td>
<td>In-store, In-store</td>
</tr>
<tr>
<td><strong>In-store Technology</strong></td>
<td>NFC, Secure element, HCE</td>
<td>NFC, Secure element, Loop Pay</td>
<td>NFC, Secure element, Loop Pay</td>
<td>Beacon, QR code</td>
<td>QR code, Scan receipt, Over-the-air</td>
<td>QR code, NFC</td>
</tr>
<tr>
<td><strong>Encryption</strong></td>
<td>Tokenized</td>
<td>Tokenized</td>
<td>Tokenized</td>
<td>Proprietary</td>
<td>Tokenized</td>
<td>Proprietary</td>
</tr>
<tr>
<td><strong>Acceptance</strong></td>
<td>NFC merchants (~200k), In-app soon</td>
<td>NFC merchants (~200k), In-app soon</td>
<td>~80% of physical merchants online, Some stores</td>
<td>Millions of merchants online</td>
<td>MCX merchants (~100k)</td>
<td>MCX merchants (~100k)</td>
</tr>
<tr>
<td><strong>Payment Method</strong></td>
<td>Cards + loyalty, Smart Tap loyalty</td>
<td>Cards</td>
<td>Cards, ACH</td>
<td>Cards + loyalty</td>
<td>ACH, Loyalty</td>
<td>Cards</td>
</tr>
<tr>
<td><strong>Platform</strong></td>
<td>iOS</td>
<td>Android</td>
<td>Android</td>
<td>All</td>
<td>All</td>
<td>All</td>
</tr>
<tr>
<td><strong>POS Payment Experience</strong></td>
<td>Tap + touch ID from locked phone</td>
<td>Unlock phone and tap</td>
<td>Unlock phone and tap</td>
<td>Unlock phone, start app and scan</td>
<td>Unlock phone, start app and scan</td>
<td>Unlock phone, start app and scan</td>
</tr>
<tr>
<td><strong>Online Payment Experience</strong></td>
<td>Click + touch ID</td>
<td>Click + touch ID or password</td>
<td>Click + touch ID or password</td>
<td>Click, type email and password</td>
<td>Click</td>
<td>Click + touch ID or password</td>
</tr>
</tbody>
</table>
Magetic Secure Transmission (MST)
“[Issuers] can’t add tap-to-pay features to their iPhone apps because Apple doesn’t let third parties use the NFC tech in its phones.”

Jason Del Rey
Senior Editor
Re/code
“If you store card numbers on the phone, they are vulnerable even if they are tokenized.”

Richard Crone
Crone Consulting
...Android Pay will allow issuers to integrate mobile payments into their mobile banking apps.
Whole Foods San Antonio, TX
Pending

Walgreens 1604 San Antonio...
Healthcare/Medical

Corner Store #44789
Gasoline/Fuel

Add this card to Android Pay.

Your card has been saved to Android Pay.
Authentication
Freaks
Fraud Stabilizes, Losses Decline

Overall Fraud Incidence and Losses, 2010-2015

SOURCE: Javelin Strategy & Research; 2016 Identity Fraud: Fraud Hits An Inflection Point; February 2016
...but this stability masks a shift in the types of payments fraud evolving.
New-Account Fraud Doubles in 2015!

New-Account Fraud Total Losses and Incidence, 2010-2015

Source: Javelin Strategy & Research; 2016 Identity Fraud: Fraud Hits An Inflection Point; February 2016
Why is NAF fastest growing fraud?

• EMV has made counterfeit card fraud more difficult.
• Counterfeit-card-fraud crime rings are now using SSN info to open new card accounts (in others’ names).
• Can use local knowledge of non-EMV-enabled merchants to target NAF card fraud.
  – Can control contact information of new card.
  – Authorize transactions when issuer calls/questions.
  – Max out credit limit before abandoning card.
Breaches: SSNs vs Cards

Breaches Exposing Social Security Numbers
Credit Card/Debit Cards (2010 - 2015)

<table>
<thead>
<tr>
<th>Year</th>
<th>Exposed SSN</th>
<th>Exposed CC/DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>62.1%</td>
<td>25.7%</td>
</tr>
<tr>
<td>2011</td>
<td>61.8%</td>
<td>26.4%</td>
</tr>
<tr>
<td>2012</td>
<td>48.0%</td>
<td>14.4%</td>
</tr>
<tr>
<td>2013</td>
<td>48.0%</td>
<td>15.6%</td>
</tr>
<tr>
<td>2014</td>
<td>41.5%</td>
<td>17.6%</td>
</tr>
<tr>
<td>2015</td>
<td>43.3%</td>
<td>20.5%</td>
</tr>
</tbody>
</table>

SOURCE: Identity Theft Resource Center; “2015 Data Breaches”; www.idtheftcenter.org; 1/25/16
2014 was the year of the credit card breach.

2015 was the year of the SSN breach.
### Compromised SSNs Explode in 2015

<table>
<thead>
<tr>
<th></th>
<th>Cards</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td># of breaches</td>
<td>138</td>
<td>160</td>
<td></td>
</tr>
<tr>
<td># of records</td>
<td>64M → .8M</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>SSNs</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td># of breaches</td>
<td>325</td>
<td>338</td>
<td></td>
</tr>
<tr>
<td># of records</td>
<td>16M → 164M</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SOURCE: ITRC Data Breach Reports 2014 and 2015; [www.idtheftcenter.org](http://www.idtheftcenter.org)
What to do...

• **Empower consumers in the fight** with mobile card controls, alert, & no-friction balance access.

• **Prepare for resurgence of Account Take-Over (ATO) fraud**, and fight with non-text two-factor authentication such as biometrics and device rep.

• **Don’t delay EMV** as fraud is concentrating among the last-to-enable.

• **Use data outside of what is provided by new account applicants to confirm their identities**, e.g., voter registration, property records, social media footprint (avoid SSN-only authentication).

SOURCE: Javelin Strategy & Research; 2016 Identity Fraud: Fraud Hits An Inflection Point; February 2016
Social Biometrics™

Realtime identity verification using online and social data

LEARN MORE ➤
Small merchants and unattended terminals will remain vulnerable.

While big merchants are well on their way, fraudsters will still have targets.

Source: Javelin Strategy & Research; "Fixing CNP Fraud: Solutions for a Pre- and Post-EMV U.S. Market; October 2014
SMALL ISSUERS
During the EMV transition, the probability of fraud will concentrate among the last to migrate.
Counterfeit Card Fraud Probability

odds: 1/3

1

2

3
Counterfeit Card Fraud Probability

**odds:** 0

**odds:** 1/2

**odds:** 1/2
Counterfeit Card Fraud Probability

1. odds: 0
2. odds: 0
3. odds: 100%
EMV Challenges

• Transitional concentrations of fraud on weakest links and last to the party
  – Debit Cards
  – Smaller Merchants

• Tokenization plays

• Signatures are meaningless…and we’re transitioning to, you guessed it, Chip & Signature EMV

• The learning curve for consumers
  – Dip and leave vs. dip and yank (gas pump)
CNP Fraud Forecast: 2018

CNP FRAUD WILL HAVE A CONSISTENT YET DRAMATIC GROWTH

CNP FRAUD WILL BE

POS CARD FRAUD BY

2018

Match Friction to Risk
DRIVING DOWN CNP FRAUD WILL REQUIRE A COMPREHENSIVE STRATEGY

CUSTOMER-DEFINED CONTROLS

ANALYTICS

AUTHENTICATION

BEHAVIORMETRICS

SOURCE: Javelin Strategy & Research; "Fixing CNP Fraud: Solutions for a Pre- and Post-EMV U.S. Market; October 2014"
Secure Personal Data Doesn’t Exist

- FIs must presume most personally identifiable customer data has already been compromised when choosing anti-fraud countermeasures:
  - Tokenize at every turn
  - **Authenticate behavior (not just data) using advanced analytics**
  - Board-level oversight
  - SSNs are dead (as authenticators)
What about **Gen Y**?
“Adults under 35 had a savings rate of negative 2% in 2014.”

SOURCE: Moody Analytics
50-60% of Generation Y confess they have **impulse purchase problems**... and huge holes in their ears.
So what’s the answer to the impulse problem?
Real-time feedback loops?
...but there are limitations to real-time feedback.
A third of US consumers who have owned an activity tracker stopped using it within six months.

Endeavour Partners, July 2014
WHY NOW

The Quantified Self has failed to measure up.

Yes, self-tracking has given people millions of data points about their lives. But for many, it's not enough.
So how to help those immune to feedback loops?

(because their brains aren’t fully mature yet)
Opt-outs and automation.
Automated savings?
Save Your Round-ups
Invest from everyday purchases by rounding up each amount to the next dollar automatically or on-demand.

Get the App
Reach your goals one save at a time

Save automatically without feeling short on cash. Decide what triggers a deposit, then improve your daily habits and build your savings with a lot less effort.
Impulse Savings

Moven

$205
Below typical spending
Lock away savings!
Make Digital Banking **Personal**

1. Mobile-first

2. Individual, actionable insights and advice

3. Contextual interaction
   - Where are they? What are they doing? How can you help?

4. Speed and real-time transactions

5. Omni-channel experience

SOURCE: Javelin's “Bank Switching: Combating ‘Silent Churn’ to Maximize Primary FI Status”; November 2015
Emerging Risks

• Existential Risks
  – The “Silent Churn” of customers’ secondary FIs/fintechs
  – Combat with personalized (contextual) digital banking

• Payments Risks
  – EMV transition concentrates fraud at late comers
  – Pre-staged tokens in HCE mobile payments
  – Faster payments will require more formal/closely considered credit-risk limits and automated enforcement

• Lending Risks
  – T&C’s of pass-thru loan arrangements between banks & alternative lenders
  – KYC on serving borrowers via alternative marketplaces
Emerging Risks, cont’d

• **Strategic Risks**
  - **Branch transformation strategy**, execution & timing
    - Divest-to-invest optimization vs. all-things-to-all-customers
  - **Digital channel strategy**, execution & timing
    - Mobile banking evolves to converge with mobile commerce, mobile personal financial management (PFM), and mobile payments
      - Migration from passive transaction/data service to active advisory service brings new risk/liability
  - **Co-innovation risk**: complex third-party ecosystems lowers probabilities of success with new innovation, but tech makes innovation (failure) cheaper & less risky than ever before