The payments revolution ... are you in?

How financial services leaders are reshaping commerce through innovation
The payments revolution ... are you in?
Introduction

Today, consumers are experiencing an explosion of choice when it comes to how they shop, pay, interact and conduct commerce. Every day, new financial and commerce solutions are introduced with a promise to simplify and improve customers’ lives, and change how fundamental aspects of banking, retail commerce and commercial transactions take place.

Financial technology – “FinTech” – companies and disruptive innovators are a key focal point, and are seen by some to threaten the core elements of the banking and financial landscape. However, in the midst of this hype, it remains unclear which of the new technology players and business models will have a meaningful, long-term impact on financial services or the broader commerce environment. Moreover, uncertainty about the future shape of the financial services landscape calls into question which technology platforms, message standards, interoperability frameworks and business models will emerge as the leading next generation winners.

Against this backdrop, banks and traditional financial services players face a host of strategic decisions regarding where and how to participate in this shifting environment in a way that is meaningful to customers, and sustainable from a business and risk perspective. This paper focuses on six megatrends that are changing the fundamental dynamics of the payments industry.

As core changes come from within the banking industry and from technology-led disruptors, this paper leverages real-world examples to illustrate options for navigating disruptive sea changes, and make the difference between capitalizing on opportunity and being capsized by disruption.
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Innovation is different this time

This is not the first time revolutionary commerce applications have surfaced. Nor is it the first time advanced analytics or technologies have appeared. From biometrics to tokenization, many of the “innovations” that are on the scene now leverage technologies that have been around for decades. Thousands of dot-coms have come and gone in the quest to transform our physical and digital worlds. In fact, less than 10 of the 450 payment-related dot-coms launched before 2000 have survived. So what’s different this time?

Innovation uptake is always challenging, but three things have fundamentally changed the landscape, making this moment in time quite different. First, the proliferation of smartphones essentially puts a computer in every hand, enabling real-time access to search, shopping and services, literally anywhere a customer wants to. The phone as an access device acts like an “always on” point of connectivity to the broader world – like a “mouse” that makes the whole world clickable. Second, well-publicized security breaches and threats have driven an appetite for increased safety measures. And third, a boom of younger, tech-savvy consumers are entering the market en masse, establishing themselves as early adopters of everything. With this consumer backdrop, everyone from FinTech start-ups to well-established companies in telecom, retail and search has ventured into the payments and financial services arena.

The result has been an innovation boom that is changing how we shop, how we pay and how we interact with retailers and service providers after the transaction is complete. Payments are the “moment of truth” in the commerce value chain, where money changes hands, so many players are seeking to embed payments into broader commerce solutions, blurring the lines around where the customer payment experience starts and ends. Merchants are linking customized payment applications to proprietary mobile shopping experiences, and service providers from taxicab companies to apartment-sharing sites are using simplified payment experiences as a key part of their customer value proposition. Yet even as payments expand across the commerce ecosystem, it still isn’t clear which changes will stick. More importantly, it can be difficult to know what banks and other traditional financial services players need to do to respond.

Right now, the industry is in a formative period where banks have a window of opportunity to proactively shape their destiny. That said, in each of six key areas, players are lining up, disruptors are wedging in and traditional players are facing important decisions about how to compete. This paper describes what we are seeing in the market, the plans and road maps of market-leading companies, and the pivot points to consider in charting a course in this new era.

The key megatrends we cover are:

- The migration from omnichannel to omnicommerce
- Advances in machine learning and analytics
- Wedging in: the innovation revolution
- The growing battle for loyalty
- Technology transformations in connectivity, efficiency and security
- Continuing regulatory scrutiny and standards development
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Section 2
The migration from omnichannel to omnicommerce

For years, companies across all industries have been working to integrate their physical and online customer channels into a seamless omnichannel experience. Whereas banks have continued to make incremental progress with omnichannel evolution, retailers have really pushed the boundaries, introducing new technologies that fundamentally change the way we shop. From endless aisles, location-based offers and ultra self-service, there is much for financial services players to consider as they shape their own omnichannel experiences.

At the edge of this trend is a movement that further blurs the lines between shopping, purchasing and paying. In this environment, payments are becoming increasingly invisible at the point of purchase. What we see emerging is an integrated shopping environment that seamlessly links search, shopping, ordering, payment, shipping and loyalty services into one smooth, low-friction ecosystem. The end-to-end experience is becoming more important than any individual product or service solution alone, and customers increasingly are frustrated by payment solutions that require sign-up, enrollment, entry of payment data or additional effort of any kind. Customers want all information seamlessly and instantly available when they complete a transaction. In this environment, it becomes critical for traditional players to endeavor to "plug into" these seamless transactions, rather than hijack their simplicity.

Blurred lines
Many of the exciting innovations in retail commerce have origins in places where real estate is incredibly expensive, such as the UK, Japan and Korea. In these countries, where population densities outstrip the US by 8x, 10x and 15x, respectively, retailers have taken omnichannel to a whole new level. In Japan, where 85% of consumers have smartphones, 25% of all ecommerce transactions within the country are now multichannel with online ordering and in-store pickup.2 In Seoul, South Korea, Tesco Homeplus has shifted the shopping experience into the subways, where commuters order groceries via kiosk to arrive at their homes at the end of their commutes. In doing so, Tesco captures the advantages of visual location-based shopping triggers without the cost of bricks and mortar.

As a driver of innovation, cost takeout has been a powerful force. Technology has become a useful tool for retailers looking to reduce the need for physical real estate or reduce labor costs. Some of the more interesting models (traditional, reimagined and brand-new) are included on the next two pages.
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As a driver of innovation, cost takeout has been a powerful force.

Endless aisles
The ability to use in-store technology (kiosks, computers, tablets, etc.) to see inventory that is not in the physical store; retailers such as Home Depot, Gap and others are effectively using the technology to increase access to inventory.

Video windows
A large-scale extension of the kiosk, the video window allows display windows to double as a shopping and ordering tool; Hugo Boss’s Sloane Square in London features such a window and has attracted more than novel attention.

Buy online, pick up in store
Retailers such as Best Buy have employed this model for some time, allowing customers to shop online and pick up merchandise in the store; lately the concept has expanded, with restaurants such as Starbucks using this model for coffee pickup.

Self-service 2.0
Chill’s is using smart tablets in its restaurants. Guests can order food and pay tableside, and servers still deliver food and provide guest services, but guests have more control over when they order and pay.

Drive-through 2.0
For years, quick service restaurants have had drive-through windows, but now drive-through is being reimagined in new businesses; Tesco supermarkets have launched drive-through locations, making it easier than ever to get a gallon of milk.

Unmanned kiosks
Gaining a lot of traction, the vending machine model is used for much more than candy and sodas, as retailers such as Benefit Cosmetics and 24 Hour Flowers move into airports and other high-traffic areas.

Smart product ID
From smartphones, Amazon’s camera icon by the search bar allows users to focus on a product and search Amazon for matches; Neiman Marcus has also added the smart search feature.

Location-based (beacons and radio frequency identification)
CVS Pharmacy asks its mobile app users to opt into receiving offers that are sent by beacons placed throughout the store.

Pop-up stores
The notion of a popup store has been used by many retailers, but is gaining even more traction at events and other venues with high traffic and limited timeframes for retailer presence.
Unmanned stores
Today, an estimated 1,500 unmanned stores selling a range of food products are located in workplaces (primarily those with 250 people or more); Visa’s cashless café features drinks, healthy lunches and snacks.

Augmented reality
Shiseido’s virtual makeup mirror captures a picture of your face and lets you test different looks and colors; other retailers are jumping in with their own versions, such as American Apparel’s color-changing app.

Cross-merchant location-based offers
Visa and Gap have teamed up to run a trial of a location-based marketing capability that triggers offers to frequent shoppers when cardholders swipe their card within the vicinity of a Gap.

Remote/machine ordering
Amazon’s Dash is a button that a customer puts in the kitchen, bath, laundry or anywhere a customer stores repeatedly purchased products. When running low, the customer presses the button and the item gets added to the customer’s online shopping basket. The customer then receives an alert on his or her phone to order the product.

Repurposed real estate
7-11 allows its convenience stores to serve as locations where users can pay their utility and other bills, including state exchange health insurance, buy prepaid cards and SIM packs, load cash value on cards and phones, and purchase online vouchers to use at online merchants.

In-store gamification
Target has introduced a game that kids can play when shopping with parents called Bullseye Playground. The game, played on a handheld device, reveals “Easter eggs” hidden throughout the store.

Alternative payment options
In addition to wallets from large phone manufacturers and search players, that are signing up merchants one by one, alternative payment players (such as PayPal) have made forays into the physical environment with the ability to use your phone number and PIN to access PayPal accounts at physical stores.
Background “invisible” payments at the point of purchase

As users store their payment information in digital wallets and applications, the payment card/vehicle is moving further into the background. At some level this is nothing new. For years, online purchases have been made using a card on file at a merchant. Buyers purchasing books or music at leading online shopping sites don’t have to repeatedly enter payment information, since “one-click” shopping experiences are common.

However, at many new mobile applications, such as those offered by car service and taxi companies, payment takes place completely in the background. Another payment innovation, Android Pay, being tested by Google in San Francisco, sends a picture of the user to the retail payment terminal without the user needing to pull out his or her device. In these cases the payment type is set up well in advance of the transaction. In a world with even more connected devices (the Internet of Things) moving payment capabilities further behind the scenes, the full payment ecosystem becomes even more complicated, even while things seem more simple to consumers. In this environment, payments players with easy-to-integrate, interoperable capabilities will be incredibly important. By contrast, payment solutions that have “one size fits all” operating models or technology capabilities will face challenges. Will banks and other traditional financial service providers rise to these new challenges? If traditional players don’t step up, it is conceivable that traditional banks and financial service providers will be relegated to being commodity “backbone” infrastructure players, while the more relevant, high-visibility customer relationships are “owned” by technology upstarts.

These trends challenge long-held ideas about what constitutes a payment vehicle. Is the payment vehicle a PAN (16-digit number identifying an account)? Is it a routing number to a bank account? Is it a phone number that unlocks a stored value account at a merchant? Is it promotional credit issued by a merchant and linked to a specific device or machine (e.g., if new “smart devices” come loaded with proprietary currency to buy items from a defined ecosystem)? For example, in October of 2015, Visa introduced a “connected car” with an initial use case built out that allows remote purchase of the vehicle where the “paperwork” and payment capabilities are built into the car, making it unnecessary for one to be at a dealer or a bank. Is this car a payment vehicle? It could be if dealer cash incentives are loaded directly into a stored value account linked to the car. In this new world, it is not clear which new players might find themselves providing core financial services, and which might need traditional players as partners.

Despite these potentially unsettling trends, traditional players still have options to remain relevant. Financial institutions bring two critically important factors that few other players provide: trust and security. Regardless of what else transpires or how financial institutions play in the future, protecting customers will remain of paramount importance. Financial institutions have this as a source of competitive advantage now and will need to relentlessly defend it.

In addition, we are seeing innovative financial services companies exploring ways to keep their brand and its inherent trust front and center. And in the background, our clients have been very actively engaged with our cybersecurity teams to shore up core payment and banking infrastructures to protect their brand promises around security in the face of more sophisticated fraud and threat schemes.

We are also seeing financial institutions with innovation road maps focused on leveraging large distribution networks and established customer bases. Just as others look to partner with banks for payments, a number of innovative banks are expanding offers and rewards that they can offer their customers. Building on concepts forged in credit card loyalty programs, some banks are seeking revenue streams for the privilege of making offers to bank customers.
The ecosystem and where to play

Another trend is that of payments moving to new venues. The emergence of “buy buttons” on non-commerce sites, including media sites and social media sites, suggests that in the future, even more transactions will be completed “in app” or wherever the consumer is spending time. Pinterest,11 presents a “buy now” button while a user explores images of shoes, allowing an exploration experience to become a purchase moment, without leaving the Pinterest site. Prior to the addition of the buy button, Pinterest users would have had to click through to the Nordstrom or other retailer site to make the purchase. Now the commerce experience is less dependent on the seller and increasingly about serving up consumer opportunities where the consumer is spending time.

Carried further, one could imagine banking on social media sites (and not just sending a person-to-person money transfer). Crowdfunding and peer-to-peer (P2P) lending sites already make it easy to receive donations or get loans, so now the natural question is how much further this trend might go. Will social media sites become banks? Would a bank provide the “pipes”? This clearly opens up new questions for banks and others playing in traditional spaces that have the potential to be transformed.

Bringing all of these factors together — blurred lines, background payments and the ecosystem of involved parties — Starbucks provides an interesting case study. Starbucks saw customers standing in line with their phones and came up with an omnichannel idea that combined a mobile app, loyalty and a payment tool operating in the background. With their fused loyalty app and payment capabilities, Starbucks also found a way to make lines move faster. Now accounting for over 20%54 of all Starbucks purchases, the Starbucks app is now going the next mile with ordering online and in-store pickup.

On the partnership front, Starbucks has forged multiple partnerships and extended its ecosystem. With the ride-sharing company Lyft, riders can collect Starbucks loyalty program stars, and drivers become automatic gold members. With The New York Times,12 loyalty members can view selections of the publication’s stories via the Starbucks app and earn stars through paid digital and print subscriptions to the newspaper. And in stores, Starbucks’ partnership with Google14 enables free Wi-Fi access.

At EY, we work with clients to help them move beyond the idea of innovation into the tricky space, where complex payment ecosystems require broad, practical knowledge to address implementation complications. These complications range from technical architecture design to multiparty accounting, settlement, reconciliation, reporting and integration challenges, often linked to inflexible legacy systems. Consequently, the successful ability to embrace omncommerce and broader ecosystem involvement requires a holistic, multilayered approach, and concrete experience with relevant target operating models.
We hear so much about big data these days. Data is collected everywhere. But most enterprises struggle to productively use the mountains of data they collect. However, recent developments in data science and machine learning allow even relatively unsophisticated businesses to take advantage of rich data analysis. In addition, a host of new business models are emerging that provide analytics capabilities as services. The convergence of these innovations in data and analytics mean that new players and new solutions are being grafted onto a wide range of more traditional payments and commerce solutions, practically requiring that payments innovations use data and analytics to create more tailored and customized solutions, before, during and after each payment. This has transformed how players configure marketing offers, price products, underwrite risk, and how and in what channels they interact.

Advanced analytics

In the world of advanced analytics, much buzz centers on machine learning. Machine learning provides an alternative to the traditional analytic methods that look at a mountain of data and try to tease out the one or two most predictive variables (in credit and loan underwriting, it is typical to use logistic regression and/or decision trees with 10-15 variables that all need to be present). Machine learning is a sophisticated way of identifying patterns that allow us to look at decision-making in new ways. Whereas predictive models allowed us to isolate discrete variables that correlated strongly with outcomes (e.g., defaults, late payments), new machine learning-based tools help to apply patterns dynamically, rather than depending on fixed rules and limited variables. It is the same kind of modeling that search engines use to process mountains of data and return search results quickly.

The implications of these capabilities make it possible to drive more granular insights into everything, from location-based, and preference-based, marketing, to advanced point-of-sale credit decisions.
Top use cases

There are four primary areas in which data analysis affects the payments space.

- **Management and business information support** – The first relates to management analytics supporting business direction and decision-making. This can mean identifying the best customers to pursue or the best products to offer to your target market. A diverse range of players also provide data provide data visualization, analysis and database tools to make it easier for enterprises of all sizes to better extract insights from data, and make better management decisions.

- **Marketing analytics** – The second is in using analytics for marketing. This spans the customer continuum and includes attracting prospects, converting prospects to buyers, cross-selling and retaining profitable customers. On the descriptive analytics front, there are applications such as Spotfire and Tableau; in social media analytics, Brandwatch; and for dynamic offer generation, tools such as Captora, Persado and IgnitionOne use advanced analytics to predict user responses to offers. JiBot and Pepper are part of a new category of digital assistants that apply machine learning to detect and simulate emotions and make better customer recommendations.

- **Process analytics** – The third area is in reducing business costs and increasing efficiencies. Be it risk management and credit underwriting or more efficient operations processes (e.g., customer onboarding), data and analytics can help drive considerable business efficiencies. Companies such as Affirm, Klarna and ZestFinance are vocal advocates for the use of analytics to transform lending. Affirm and Klarna enable customers to finance purchases at the time of transaction, offering payment-term options as part of the merchant checkout process. With a few pieces of information shared by the customer and a sophisticated data back end, these companies assess creditworthiness and offer customer loans during the buying process. ZestFinance’s business model started by offering data-driven lending solutions to offer loans to customers that traditional lenders miss (underbanked, thin credit files). The company was founded by a team of data scientists with backgrounds at leading search engine and credit card companies, and is now positioning itself to help other financial institutions use this analysis to enhance their credit underwriting capabilities.

- **Information security** – The fourth area is in security, especially authentication, fraud protection and detection, and cybersecurity pursuits. Los Alamos National Laboratory is one example of an enterprise that has developed a great model of how to leverage data analytics to enhance information security practices. The PathScan solution is a new technology that EY is working with Los Alamos to commercialize that makes it cost effective for large network-based enterprises to use advanced analytics to monitor and detect information security risks, going far beyond simple rules-based capabilities.
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## Tools and technologies

We have previously mentioned a few of the technologies that are being talked about a great deal. However, there are dozens upon dozens of good technologies available to be employed by today’s data scientists.

Some of the more well-known tools are listed here by the type of analytics they enable:

<table>
<thead>
<tr>
<th>Logic</th>
<th>Analysis</th>
<th>Statistical modeling/ machine learning</th>
<th>Performance optimization</th>
<th>Simulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Descriptive analytics</td>
<td>• Cluster analysis</td>
<td>• Chaid analysis</td>
<td>• Campaign analysis</td>
<td>• Monte Carlo analysis</td>
</tr>
<tr>
<td>• Univariate analytics</td>
<td>• Statistical testing – t-test, chi-square, ANOVA</td>
<td>• Regression analysis</td>
<td>• Pricing analysis</td>
<td>• Conjoint analysis</td>
</tr>
<tr>
<td>• Bivariate analytics</td>
<td>• Latent class analysis</td>
<td>• Decision trees</td>
<td>• Survival analysis</td>
<td>• Retention analysis</td>
</tr>
<tr>
<td>• Multivariate analytics</td>
<td>• Discriminant analysis</td>
<td>• Neural network</td>
<td>• Pareto analysis</td>
<td>• Survey analysis</td>
</tr>
</tbody>
</table>

- Hadoop, Hbase, Hive, Spark, Storm, Splunk, Pig, Oozie
- SAS, SPSS, R, Python, Knex, Knime, Weka, MiniTab, Mahout, iLog, Matlab, Statistica, Evolver
- Apache, Cloudera, Hortonworks, MapR, IBM, Cassandra, Hypertable, Amazon
- UIMA, Rapid Miner, Tesseract Cafe, Brandwatch, Crimson Hexagon, Radian6, Symosis, Lithium
- MondoDB, CouchDb, Neo4J, Infinite, Marklogic, Amazon Dynamo, TITAN

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<thead>
<tr>
<th>Data</th>
<th>Structured data</th>
<th>Unstructured data</th>
<th>Streaming</th>
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<tbody>
<tr>
<td>• Data profiling</td>
<td>• Data modeling</td>
<td>• Data integration</td>
<td>• Big data</td>
</tr>
<tr>
<td>• Data quality</td>
<td>• MDM data conversion/ migration</td>
<td>• Enterprise data warehouse</td>
<td>• Social media</td>
</tr>
<tr>
<td>• Data governance</td>
<td></td>
<td>• Enterprise reporting</td>
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</table>

- Erwin, ER/Studio, Visio, DB Designer
- Trillium, D3JS, IDL, Riverstand, TIBCO Spotfire, Tableau, SSRS, SSAS, PowerTools
- SAP, BDOS Oracle DI, IBM Data Stage, IBM Information Analyzer, Business glossary, IBM MDM, DB2
- SAP MDM, Oracle MDM, Oracle Essbase, IBM, COGNOS, Microstrategy, SAP BO, Oracle OBIEE

- SAP HANA, Oracle Exadata, Oracle Times 10, Terradata, IBM Netezza, HP

However, even with the new tools, there is still a need for data unification. Now more than ever, the unified view should not be a one-time exercise, but something that is maintained by capturing every interaction with the customer across the value chain. Customers expect a consistent approach across channels and they get frustrated when touch points are disconnected. Leveraging insights from all sources helps establish trust and deeper relationships that are more likely to result in an emotional connection.

Organizations also need to plan for platforms for common services such as natural language processing and machine learning in a way that structured taxonomies for emotional attributes can be deployed.

At EY, we have a dedicated data and analytics practice that focuses on helping clients best take advantage of these advances. This practice works with a range of payments-related players, both traditional players and upstarts, to design and implement programs that efficiently and effectively link advanced analytics and customer insights to seamless end-to-end payment services.
At this moment, we are in the center of an innovation revolution. With banks focused on regulation and updating legacy infrastructures, what was once an innovation void is quickly being filled with the next wave of dot-com companies and FinTechs looking to challenge the preeminence of banks and payment processors. In fact, global investments in financial services-related start-ups have risen from US$3 billion in 2013 to an estimated year-end close of US$24 billion in 2015, with more than half of those linked to payments.20

Innovators are wedging into inefficient spaces, tackling everything from money movement to cumbersome application processes, slow loan approvals and expensive rates. And differently than in the past, not all the innovators are small start-ups. Today, along with the start-ups are goliaths of industry, including global mobile carriers, internet giants, technology manufacturers and large retailers. Everywhere we look, there is heavy investment in the future of payments and a quest to transform inherent inefficiencies in the broader world of banking and investing.

A wide range of companies are innovating directly in the payments space, or combining elements of a payment solution (e.g., card-based stored value accounts, unsecured lending or point-of-purchase lending) in innovative new ways. A few interesting examples include:

<table>
<thead>
<tr>
<th>Payments</th>
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| **Apple Pay**<sup>21</sup>  
Digital wallet that allows card use over iPhone |
| **Facebook Messenger**<sup>22</sup>  
Payment transfer to friends from Facebook app |
| **Google Wallet**<sup>23</sup>  
Digital wallet with loyalty, offers, gift cards, P2P |
| **Samsung Pay**  
Mobile digital wallet |
| **SnapCash**  
Person-to-person money transfer and ability to accept credit cards (SquareCash) |
| **Square**  
Mobile payment acceptance for merchants |
| **Starbucks Payments**  
Mobile application with ordering, payment, loyalty, marketing capabilities |
| **Stripe**  
Payment solutions for online merchants |
| **Venmo**  
Digital wallet for splitting bills and transferring money |
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<tr>
<th>Lending/borrowing</th>
<th>Banking alternatives</th>
<th>Business-to-business lending</th>
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<tr>
<td><strong>Affirm</strong></td>
<td><strong>Bluebird</strong></td>
<td><strong>Business2Credit</strong></td>
</tr>
<tr>
<td>Installment loans at the point of sale</td>
<td>Online checking account alternative with direct deposit, online bill pay</td>
<td>Financing to small and medium-sized businesses; matches borrowers to banks</td>
</tr>
<tr>
<td><strong>CommonBond</strong></td>
<td><strong>Kaiku</strong></td>
<td><strong>Funding Circle</strong></td>
</tr>
<tr>
<td>Loan consolidation and refinancing for student loans</td>
<td>Online banking with direct deposit online bill pay, card-to-card money transfer</td>
<td>Peer-to-peer lending place for small businesses</td>
</tr>
<tr>
<td><strong>Klarna</strong></td>
<td><strong>Moven</strong></td>
<td><strong>Lufax</strong></td>
</tr>
<tr>
<td>After-delivery payment (assumes fraud risk)</td>
<td>Debit card with notification of payments and tracking to user-defined budget</td>
<td>Financing to small and medium-sized businesses</td>
</tr>
<tr>
<td><strong>Lending Club</strong></td>
<td><strong>Pave</strong></td>
<td><strong>OnDeck</strong></td>
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<tr>
<td>Peer-to-peer lending</td>
<td>Lending platform – investment by individuals on students with potential</td>
<td>Financing to small and medium-sized businesses</td>
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<td><strong>Prosper</strong></td>
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<tr>
<td>Peer-to-peer lending</td>
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<tr>
<td><strong>SoFi</strong></td>
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<tr>
<td>Loan consolidation and refinancing for student loans</td>
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</table>
Impact of these innovations: threats or opportunities?

Although most of these innovators do not drive significant transaction or loan volume, they do provide interesting technology platforms and user experience capabilities that might benefit from broader distribution. In fact, the volumes at the moment are quite small when compared to traditional financial service providers, as shown in the graphs to the right.

However, with incredibly high growth rates and adoption by attractive market segments, traditional banks and payments players have taken note. And while some traditional players look with trepidation at the US$4 trillion addressable market, others are looking to create partnerships or unique proprietary offerings via acquisitions of these innovative companies.

But what does it take to succeed? Fintechs claim that simple business models built on more agile technology are key. In terms of user experience, the applications are also quite simple. However, the most important success factors often are linked to unique customer experiences that “weave together” elements of payments, data and technology to make a solution that works easily for the customer.

PayPal stands out as one of the few innovative payment companies able to survive the shakeout and illustrates an important lesson in what it takes to succeed. Seventeen years ago, PayPal solved the online trust problem of allowing individuals transacting over the internet to easily send money to one another, and for small merchants to accept card payments without a long history as a traditional merchant. Propelled by the needs of eBay buyers and
sellers, a PayPal account provided an alternative to sending cash and checks by mail. One of the more important lessons of PayPal is that it found both a significant need and provided a substantially better solution than the status quo. The result is that nearly two decades later, the firm boasts 173 million active customer accounts (a small number compared with the 1.7 billion Visa, MasterCard, American Express and Discover credit and charge cards in the market), but nonetheless PayPal stands among a very small crowd of companies that have made inroads in changing consumer payment behavior.

For new players seeking to solve a significant need and provide a substantially better solution than the status quo, other key issues to solve are regulatory scrutiny and scale complexity. Some of the innovative advantages could dissolve if the regulatory dimension changes or if scale adds complexity to the business infrastructure. Many of the new lending models are not currently regulated, and most new lenders have not tested their credit underwriting models during economic downturns. This begs an important question for banks that do lots of things and do so in a highly regulated environment: how can you make your products simpler and the user experience more compelling, while enabling consumers to continue enjoying all of the consumer protections that regulators want?

In working with our clients, we have seen several models for reacting to this competitive set. Among the larger banks, the “invest and learn” strategy is prevalent. For example, EY has helped some of our clients (banks and payment processors) to develop application program interfaces (APIs), software development kits (SDKs) and more flexible architecture frameworks so that other entities may design applications that will work on their infrastructure. Another key strategy is “reserving the right to play” by making investments in launching and testing solutions. In most cases, traditional players that actively engage in the innovation marketplace (versus watch from the sidelines) are gaining important market information that strengthens their talent bench and customer knowledge. As customers, demographics and attitudes change, this is more important than ever.

Serving underserved segments

Another area innovators are wedging in is with underserved population segments. In its most recent national survey of the unbanked and underbanked, the Federal Deposit Insurance Corporation (FDIC) reported that 93 million people, representing nearly 25 million households, were either unbanked or underbanked.20 These populations add up to 27% of US households overall. Within the age cohort called millennials (currently ages 15-34), the percent is 74% unbanked and underbanked.

Of course, companies targeting these populations have existed for years. Specifically, the financial needs of the unbanked and underbanked have been filled by payday lenders, cross-border money transfer services, and individual credit arrangements with merchants and service providers (e.g., doctors or shop owners allowing bills to be paid in installments). Many companies have prospered in this market, even amid frequent criticisms of high fees and usurious rates. But beyond these traditional providers, new models have been growing in popularity, many of which also feature lower costs to consumers and the promise of alternative risk management and underwriting solutions that support those solutions.

In health care, a recent Centers for Disease Control and Prevention (CDC) survey indicates that more than 25% of families in the US have experienced financial burdens resulting from medical care.31 The unbanked and underbanked lack access to payment and financing tools available to banked customers (e.g., home equity lines, credit cards and 401(k)s). To meet the needs of this segment, innovators such as American Healthcare Lending and Care Credit (from Synchrony) offer lending options around specific medical and dental procedures, while others, such as GiveForward.com, YouCaring.com and FundRazr.com, provide opportunities for crowdfunding.

According to the Bureau of Labor Statistics, the daily spending category, which includes spending on food, apparel and entertainment, accounts for 20% of personal consumption expenditures.34 Because an estimated 63% of millennial consumers do not have a credit card, they can’t use that convenient tool to make their purchases.35 The root cause of this mismatch is that the unbanked and underbanked do not typically have enough credit bureau file data needed to qualify for credit (cards, loans, etc.). The growing ranks of consumers with these “thin credit files” are the focus of innovators who seek to improve mechanisms for underwriting credit or provide alternative payment models, such as prepaid cards or new “debit-like” spending cards linked to digital accounts.

The first model uses alternative data sources to lend to those with thin files, augmenting traditional “credit” data with bill payment data, social media information and other variables thought to provide more insight into customer creditworthiness. Lenders such as Lending Tree, Prosper, etc. use this type of data, gathered directly or through data sources such as Pay Rent, Build Credit (a MicroBilt). Traditional players are also getting into this space, with credit bureaus adding new products designed to expand the boundaries of traditional data collection. Many traditional lenders are also exploring how to leverage these new data sources.

On the prepaid front, the growth in online buying has supercharged the market for prepaid cards, while prepaid payroll card solutions have provided employers with a more efficient way to pay workers. According to one
recent payment study, digital commerce grew 22% in 2014 (compared with 6% growth in overall consumption)\(^{36}\). Given this backdrop, it is little wonder that prepaid has grown tremendously among the unbanked and underbanked, with 22.3% of the unbanked using prepaid cards, compared with 13.1% of underbanked households\(^{37}\) and 5.3% of banked households.

For banks and other traditional financial services players, the trend of providing services to underserved markets cannot be ignored. And even though many traditional banks do not find the economics of some of the products (e.g., prepaid products) to be particularly attractive, these products are often important “gateway products,” as underbanked consumers start to engage more with traditional financial solutions. This is especially true of underbanked consumers who will age into their wealth and traditional financial solutions. This is especially true of younger consumers who will age into their wealth and begin to use traditional financial services. The key will be to avoid allowing others to capture these consumers early and potentially lock in relationships that banks will have to later unseat.

### Merchant innovations

Not all innovations solve a consumer problem. Merchants, large and small, are also the focus of meaningful innovation. For smaller merchants, ease of acceptance has long been an issue. To address this issue, Braintree and Stripe have simplified merchant payment acceptance online. And in the physical world, Square, a company that introduced a small device that attaches to a phone or tablet, has gained early traction among a host of physical world merchants with its easy-to-use solution.

Many smaller merchants are also looking for ways to simplify their point-of-sale (POS) environments and move away from expensive cash registers. As a result, many equipment manufacturers are creating simple tablet-based POS solutions that handle payments, inventory management ordering, sales tracking and a host of other business productivity applications. Service providers such as ShopKeep and Erply provide a range of low-cost POS solutions that integrate a suite of business applications. Equipment manufacturer NCR has its own low-cost tablet POS solution, NCR Silver, which offers a similar value proposition.

For larger merchants, the cost associated with processing (service charges and interchange) has been a long-standing source of pain. In their first wave of action to address the cost pain, a group of merchants sued Visa and MasterCard over acceptance rules and interchange rates. In their second wave, merchants took the battle to Congress and the Durbin Amendment to the Dodd-Frank Act was born, dictating caps for debit interchange rates and routing options. Today, a third wave is being launched with a resurgent interest in merchant payment and loyalty consortia (e.g., MCX and Plenti), private-label payment solutions, innovative “debit-like” offerings and multifunction prepaid offerings designed by the merchants to create unique, targeted customer experiences.

Private label cards, which have long been a means for merchants to offer their customers financing for in-store purchases, are currently enjoying a resurgence of popularity. The newest twist is that merchants are looking to link traditional private-label credit programs with innovative “debit-like” alternatives. Target,\(^{38}\) in addition to their co-branded affinity credit cards, also offers a decoupled debit card called the Target REDcard that hooks to a customer’s bank account and offers store rewards in exchange for this ability to use the Automated Clearing House (ACH) (vs. Visa/MasterCard) rails. Nordstrom also offers a card where purchases are drawn directly from the customer’s personal bank account (via ACH).

On the prepaid front, Target also offers the option of a prepaid card that can be used at other merchants. And Walmart’s\(^{39}\) American Express Bluebird takes the prepaid concept a step further by tying in electronic check deposit, ATM access, mobile banking, P2P money transfer and bill pay. With the Bluebird card, users are able to reload their cards at Walmart stores.

A few traditional payment players are seeking to take advantage of these merchant-oriented trends by making it easier for merchants to integrate their customized programs with traditional banking and card solutions. The Chase Pay innovation is one example of a bank-led initiative that combines merchant links and unique offerings with a general purpose set of bank products.

### What about wallets?

Much payment innovation (and associated press) has centered on digital wallets. Defined broadly, a “digital wallet” has two key components: the user interface/experience that integrates a range of payment-related functions into one, unified experience, and the underlying payment mechanisms and infrastructure used to route the payment itself. Players such as PayPal and Amazon.com\(^{40}\) have spent years building unique, streamlined experiences that unify customer interactions, while providing a “wallet” for multiple underlying payment mechanisms. Visa Checkout and MasterPass online are other wallet examples, as are a host of proprietary bank-driven solutions. More recently, a number of mobile wallets have been introduced by device manufacturers and operating system providers, including Apple,\(^{41}\) Android/Google and Samsung. For these wallets, the device is a mobile phone and works at a physical point of sale. For the mobile wallets, using the technology in smartphones (e.g., near-field communication chips or Bluetooth low energy), the phone sends a unique identifier code, a token, from the smartphone to the receiver (which avoids sharing the card number with the merchant).
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The payments revolution... are you in?
Adoption statistics suggest that the key to digital wallet success is how well the digital wallet experience improves on the status quo end-to-end experience. As with the PayPal and Amazon.com examples, a simplified user experience that integrated multiple steps, including payment, provision of shipping data, etc., is enough of a customer improvement (for consumers and the merchant) to see very high adoption rates. By contrast, many of the new mobile wallets designed for point-of-sale checkout don’t add a material improvement to the customer POS experience, explaining low adoption volumes relative to overall spending. Specifically, while digital wallet transaction volume estimates range from US$6 billion to US$16 billion worldwide, total personal consumption expenditures worldwide are well over US$20 trillion, which puts penetration in the hundredth of a percent range. As for number of users, Juniper Research estimates 200 million mobile wallet users worldwide by the end of 2016, up from 100 million at the end of 2014. Given the world population is in excess of 7 billion, this is, again, small. But as many proponents of mobile wallets point out, the growth rates are what are significant.

Big or small, it seems just about everyone is jumping into the game and building their own wallet, which, of course, begs a number of questions. How many wallets are needed? What is the impact of losing brand visibility by sharing brand space with other major wallet brands? And should banks be in the business of offering their own wallets?

At the end of 2015, JPMorgan Chase announced their wallet related play, Chase Pay. JPMorgan Chase’s offering includes a closed network available only to Chase customers, and providing unique advantages to merchants and consumers when Chase Pay is used at a Chase merchant. The bank has already lined up a large number of merchants, including Walmart and Best Buy, to accept payments through its technology. In this scenario, Chase can set its own pricing and benefits terms for both the consumer and merchant-side of the payment, thus creating a new “value-oriented” virtual network that is designed to be a differentiator for Chase on the issuing and acquiring sides of the business. What is most critical to this value proposition is not the wallet technology itself, but the unique packaging of customer value.

In helping our clients navigate this evolving marketplace, we encourage a thorough consideration of a number of tough questions, including:

- What is the end-to-end customer value proposition the bank wants to provide for its customers (consumers and merchants)?
- Which payment innovations matter to your best customers? Your future customers?
- How will you address the challenges of integrating innovation in an aging legacy infrastructure?
- How should you prioritize scarce resources to optimize short- and long-term success?
- Where are your customers on the innovation adoption curve?
- What type of partner/acquisition strategy is right for your organization?
As information transparency makes price shopping easier and easier, businesses of all types face new competitive challenges, seeking to differentiate in a way that drives loyalty and repeat purchases. The same forces driving an end-to-end view of customer experience are extending the ecosystem of players involved in loyalty programs. The emphasis on analytics is also pronounced in the loyalty arena as banks and merchants alike use data and analytics to enrich their knowledge of customer preferences, deepen customer relationships and seek to generate repeat sales. Likewise, innovators abound in the loyalty space and increasingly, loyalty and payments schemes are coming together to provide a more holistic and integrated customer experience.

As mentioned earlier, Starbucks is a strong example of a company that has transformed its loyalty program into an extensive loyalty and commerce platform. The My Starbucks Rewards platform leverages the Starbucks mobile app to connect with customers across a wide range of use cases, including payments for in-store purchases, virtual gift card purchases, remote ordering, store location finder, free product redemption, marketing offer delivery and a range of other services.

Challenges with loyalty (cost, differentiation)

Loyalty has always been a one-upmanship game. Those competing for customer attention have long sought to create distinct and engaging customer experiences. Lexus introduced beautiful waiting room lounges for their customers to enjoy while their cars were being serviced. Quickly copied by others in the industry, Lexus began leaving bottled water in the cars. Copied. The Lexus example is an interesting and illustrative example of just how short-lived and difficult it can be to sustain differentiation in a highly competitive market.

What is perhaps most challenging for those intent on creating experiences that delight are the escalating costs of benefits escalation. In the banking space, the credit card business provides many notable case studies of the battleground to create distinctive rewards and loyalty schemes. Card issuers have been in a loyalty “arms race” since the 1990s, such that card industry differentiation includes a range of travel, retail and “experience” rewards; differentiated card colors (classic, gold, platinum, black, etc.); personalization (e.g., pictures of your dogs or kids); charitable/purpose-driven schemes; and the thousands of permutations of each.
Using greater analytic power, the next evolution of differentiation will drive more granular differentiation:

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**Micro-personalization**

Micro-personalization loyalty schemes use data specific to an individual consumer to create offers that the consumer will likely respond to. Many of these schemes are tied to purchasing to promote future purchases.

- **Wrap** is a leader in micro-targeting. Wrap attaches to an electronic receipt and provides a mechanism for suggesting future purchases. Being tested by Nordstrom, a customer receiving an electronic receipt for a newly purchased shirt might get suggestions for matching pants, handbag, jewelry and shoes.

- **BankAmeriDeals** – Customers earn cash-back rewards by using their credit and debit cards. They then individually choose where to route the cash rewards.

**Next-generation segments**

Similar to what has been done in the past relative to segment-level rewards, next-gen segments are smaller segments of consumers and/or loyalty schemes that couple micro-personalization for a cohort of consumers.

- **Amazon Family** – Amazon Family is a loyalty program for parents and caregivers with targeted rewards, such as discounts on diaper subscriptions.

- **Walgreens** – Walgreens targets the health-conscious with its Balance Rewards Points program that allows customers to earn points for healthy behavior (e.g., per mile walked). Points are exchanged for reward dollars used for in-store purchases.

- **Belly** – Belly is a rewards platform that individual small businesses can use to create their own loyalty programs with rewards specific to their individual store.

**Geographic**

Using location-based data and/or location-based beacon technology to generate offers based on specific locations, geographic loyalty is focused on generating an incremental purchase based on proximity markers.

- **Foursquare** – By tracking the places a user goes and combining that with information the user shares about his or her preferences, Foursquare suggests places to go around a user's current location.

- **Groupon** – Groupon lets consumers search for marketplace deals that are being offered nearby and includes both those that are time-sensitive and rolling.

- **Starbucks** – In conjunction with Visa and Gap, purchases made in a Starbucks store with a Visa card trigger a coupon for Gap purchases at a nearby Gap.

- **CVS** – Customers with the CVS app can opt into getting in-store coupons sent to their mobile phones when they pass locations in the store triggering beacon-based offers.

**Mass ecosystem**

Mass ecosystem loyalty describes a set of new loyalty schemes that bring together noncompetitive ecosystems of companies to share in rewards programs.

- **Plenti** – Plenti is a multiparty loyalty program launched by American Express that introduces a network of merchants, including Macy's, AT&T, Exxon Mobile, Nationwide and RiteAid, where consumers can earn or spend points at any of the in-network companies.

- **Marks & Spencer** – The British retailer offers gift cards to investors as an alternative to dividends. The cards operate like a gift card by offering credit that can be used to shop in Marks & Spencer stores in Britain and online.

- **Merchant Customer Exchange (MCX)** – In development with its CurrentC solution, this merchant-owned mobile commerce network plans to offer a mobile wallet downloadable app that lets customers earn points at participating merchants.
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With so many examples of loyalty benefits escalation and copying, most banks are continually evolving their offerings. But examples such as Starbucks show the importance of combining benefits into unique experiences that solve problems or pain points for customers. Those “experience-based” loyalty innovations are often stickier for customers and harder to copy. Applications that allow users to occupy little bits of time productively are making life easier and keeping us all connected longer. Banks have come a long way in their mobile offerings, but still have a long way to go. Paying bills online while commuting is a productive use of time. Transferring money to a friend while at dinner is productive. But if it takes 10-14 clicks to send money via a bank application, versus simple, streamlined service provided by a FinTech player,50 traditional players have missed an opportunity to create an experience that generates loyalty. Consequently, a key takeaway for traditional financial services players is to try to find opportunities to build loyalty through better experiences, either directly in the banking/financial services environment or in partnership with other commerce players.

Role of emotions in loyalty building

Most traditional financial services providers place great importance on customer experience. And while most banks are improving, the customer experience bar keeps getting higher. Today, at the forefront, is the notion of emotional engagement. Customer experiences in financial services are not just confined to in-branch experiences. As customers interact more with machines and devices, the nature of these interactions and the expectations of them have evolved. As businesses and brands seek to deepen their relationships with all of us, they have started to realize the power of designing for emotional connection.

Designing and enabling these human-device interactions has evolved and become increasingly strategic and sophisticated. While first-generation websites resembled the company’s printed collateral, the role of designers was limited to displaying information in an attractive visual way. Today, in a growing number of cases, digital is the first and only channel through which customers interact with a brand, and there is continuous navigation between online and offline channels over a range of devices. In this increasingly prevailing world, design has evolved into a strategic system of multiple interrelated disciplines — user experience (UX), user interface (UI), data architecture and other disciplines. In the most advanced organizations, a shared culture of user-centered focus spans across the organization.

Based on abundant research and EY experience helping leading companies design strategies to drive personal customer experiences and specific behaviors, EY has developed a framework for creating compelling customer experiences that drive business results. At its core, good emotional design is appealing, effective, emotive and memorable. While each of these dimensions or levels of emotional engagement drive different behavioral outcomes and deal with different cognitive processes, in practice they interact with each other and therefore must be addressed holistically.

Today, consumer expectations with digital experiences are higher than ever and play a key role in building or degrading loyalty. Done well, emotional design can deliver authenticity and emotional connection, and lead to higher engagement levels, conversion rates, greater brand advocacy, loyalty and stickiness. Within our client base, we work with clients to integrate emotional design elements in their online and mobile experiences. The reality is that emotions are engaged in all interactions, regardless of whether they have been created thoughtfully or left to chance. Therefore, an integrated program designed to be appealing, efficient, emotive and memorable is key to shaping desired consumer experiences and behaviors. Integrating an effective process, engaging the organization, and applying agile and flexible technology help to build the right infrastructure for lasting customer connectivity.
Section 6
Technology transformations in connectivity, efficiency and security

In the payments technology space, the big news focuses on connectivity, efficiency, fraud protection and security. Technologies (and standards) in the spotlight due to their use in marketing and facilitating sales include technologies such as radio frequency identification, near-field communications, host card emulation, EMV (Europay, MasterCard and Visa), beacons, QR codes and global positioning systems. Many international payment solutions are also grappling with the adoption of the International Organization for Standardization’s new ISO 2022 payment standard. On the efficiency front, blockchain/distributed ledger and distributed infrastructure technologies are being looked at for money transfer, efficient contracting applications and to authenticate, authorize and track transactions. In fraud protection and security, tokenization and biometric technologies are being used to address fraud and security challenges. Additionally, there is an entire field of data protection and cybersecurity that uses advanced analytics, technologies and practices to protect networks and data from attacks, unauthorized access, account takeovers, social engineering, hacktivists and the like.

Connectivity technology and standards
Key standards that govern in the current payment environment include:

- **Radio frequency identification (RFID)** – RFID uses radio waves to uniquely identify items, and operates using tags, readers and antennas (e.g., UPC bar codes, security scanners). Near-field communications (NFC) is a specialized subset of RFID technology that is used in contact-less payments because it allows a secure form of data exchange.

- **NFC** – NFC technology allows two local devices to share small bits of data with one another when in close proximity. In order for it to work, both devices need to have an NFC-enabled technology. This technology can be embedded on a payment card’s chip, in a phone’s SIM chip, in fobs, etc., and use the ISO/IEC 14443 contact-less communications protocol.

- **Host card emulation (HCE)** – HCE is a technology architecture that makes it possible to deliver the NFC protocol to the main operating system of a mobile device (through an app or pushed-out operating system upgrade) instead of it being embedded in the phone’s SIM chip. The phone will then emulate the NFC chip and communicate with an NFC-enabled device. A phone can then act like a card in stores, as a transit card for commuting, etc.

- **EMV** – EMV is a technical standard developed by Europay, MasterCard and Visa (EMV) that dictates the terms of interoperability for chip cards (cards with integrated circuits, also called EMV card and IC cards) and payment terminals or automated teller machines embedded with technology to read the chip-based information. The chips can be contact-based chips (using standard ISO/IEC 7816) that are inserted into readers or contact-less-based chips (using standard ISO/IEC 14443) that are read using RFID technology.
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ISO/IEC 2022 – The ISO/IEC 2022 standard was developed as a technique to represent characters in multiple character sets within a single character encoding, and to represent large character sets so as to accommodate languages with greater character-set needs.

Beacons – Beacons are small devices (about the size of a hockey puck) that are being used in stores to detect mobile apps loaded on a shopper’s phone and send offers or otherwise interact with users when in close proximity. Settings in the app allow the user to turn on the functionality.

QR codes – QR codes are machine-readable codes that are read by QR readers by the cameras on smartphones. They consist of an array of black and white squares. In payments, PayPal is using QR codes. It works by opening PayPal, checking in at a location, and producing a QR code the merchant can read with a QR reader or a four-digit code that can be used on a PIN pad.

Global positioning systems (GPS) – GPS location technology is used in payments with other payment functionality. For example, Square taps into the GPS location technology in phones to verify the locations of transactions and minimize fraud and payment disputes.

Efficiency
Blockchain/distributed ledger technology, originally known as the technology for bitcoin, is now being explored by many companies interested in distributed ledger capabilities. For many, it represents a new mechanism for driving out system costs and creating greater efficiency in buying, selling and managing contracts between multiple connected parties.

Distributed ledger – An activity ledger shared among parties (known trusted partners such as a group of companies that regularly buy and sell to one another, or completely unknown people or companies loosely networked together by virtue of their participation in the activities tracked by the ledger). Unlike a ledger that is owned by one company (e.g., Ford Motor Company) or one entity (e.g., a stock exchange), the distributed ledger is collectively owned, and activity is transparent to all participating parties.

Blockchain – A blockchain is a sequence of “completed blocks.” Each block describes a transaction. Blocks are added to the chain as each is validated, making the entire chain a historically accurate record of all activity. The blockchain serves as a ledger of all activity.

Distributed infrastructure – Technology allowing the distribution of trusted value transfer and execution, allowing the disintermediation of intermediaries: the network becomes the intermediary. The three main characteristics of the infrastructure are digital identity (the ability to uniquely and dependably identify parties), provable transactions (the ability to authenticate that activity has occurred) and autonomous execution (the ability to execute software instructions without intervention).

Security
Payment security involves a system of technologies, processes and procedures that protect against fraud and abuse throughout the entire payment life cycle, from authentication and authorization to post-payment disputes and resolution. Security covers all aspects of data protection, including data in transit and at rest. A few of the trending technologies in this complex area are:

Tokenization – Tokenization is a process by which the primary account number (PAN) is replaced with a substitute value called a token. In order for a complete tokenization system to work, it requires management tools (a mechanism for enrolling products, provisioning tokens, adding/deleting tokens, managing metadata), a token vault (storing tokens and domain restrictions, linking to the cardholder’s PAN), enabled acceptance devices and a means of managing risk (placing controls on products). In use when a customer uses her card, her PAN is replaced by a separate numeric value (the merchant can store this value (value = Jane Doe)), the token is transferred to the processor (e.g., Visa or MasterCard) who de-tokenizes it. Different players use different versions of this technology, but generally a unique and/or dynamic token number is unusable by anyone else again or by any other merchant.

Biometrics – Biometrics refers to using unique biological information (e.g., fingerprints, retina scanning) to uniquely identify a person. In payments, biometrics are being used as authentication security in phones and in some POS terminals.
Connectivity technology and standards

Recently, the payments industry has been inundated with an alphabet soup of new technologies: RFID, NFC, HCE, EMV, IC, QR, etc. Most technologies focus on solutions that add convenience and security with faster and safer technologies.

Whether new payment technologies such as NFC/RFID are faster is up for debate. In a location such as Starbucks where those in line are already on their phones, an argument can be made for the phone-initiated payment being faster than digging out one’s wallet. However, many argue that in the average woman’s purse, locating the phone and wallet are equally simple, and that paying with a magnetic-stripe card is faster than either a phone or a chip-enabled card.

EMV and tokenization technologies do add security advantages vs. existing technology, especially when combined with capabilities that encrypt payment data and minimize card numbers stored in merchant systems. These types of technologies help protect against counterfeit card fraud and the all-too-common data breaches associated with attacks against merchant “data at rest.” Although none of these technologies promises protection against all cybersecurity or fraud challenges, these innovations do help merchants and card issuers concerned with rising fraud liability. Most of these innovations, however, don’t have a material benefit for consumers, since they are typically covered by strong liability protection regulation (limiting credit card loss liability to US$50) and card brand promises of “zero liability.”

Apart from the notions of speed and safety, the question of consumer and merchant adoption still needs to play out. The reality is that there is a variety of different technologies, and it is still not clear which of the competing technologies will “have the most staying power.” More predictably, we do expect to see more devices being embedded with payment capabilities (e.g., wearable technology, the Internet of Things), more delivery services, and many more location-based marketing and customer targeting activities.

For banks there is an abundance of choice. The trick is in picking the right technologies for your environment (issuing, acquiring, processing, network) and your customers. Our clients are focused on capitalizing on what makes them unique and matching that to the choices of where and how they invest.

Efficiency

On the efficiency front, much of the focus has been on blockchain and distributed ledger technology. Originally gaining notice as the technological framework for bitcoin, this technology is now being looked at more for its efficiency characteristics than its use in cryptocurrency deployment. We see very few organizations seriously pursing bitcoin or other cryptocurrencies at the moment, yet a great many are looking at the underlying blockchain/distributed ledger technology.

Blockchain technologies create an open system (a “ledger”) for participants to authenticate, authorize and track transactions. The technology can be used to modernize the way value is transferred and multiparty marketplaces are run. Everything from markets for foreign exchange, equities and commodities to multiparty loyalty networks could be affected. It also has the ability to write intelligent software in the ledger (“smart contracts”), which can be used in a variety of financial and nonfinancial cases. Many large banking clients are investing in this new technology and piloting new use cases that seek to use this technology to drive efficiency, speed and accounting simplicity.

New companies begin exploring the technology every day, so the list of competitors and innovators continues to evolve. However, companies to watch are partnering with a wide range of financial services giants. For example, Santander announced that it is testing 25 use cases for the blockchain. The bank thinks that it might save US$20 billion annually on international transaction and settlement costs. BNY Mellon is looking at blockchain to reduce payments risk and increase transparency. Barclays is engaged in more than 45 different experiments related to blockchain. BBVA is investing $75 million in Coinbase. And perhaps most interesting, more than 25 banks created R3 CEV, a cross-industry distributed ledger that is experimenting with standardizing interbank communication and value transfer.

Despite all of the innovation and activity, the technology still has a long way to go versus simple ledgers. Today, the bitcoin network is restricted to a sustained rate of seven transactions per second due to the bitcoin protocol restricting block sizes to 1MB. Nonetheless, the technology is interesting, and we expect to see today’s consortia and pilots evolve over time. We expect the first phase of development to focus on permissioned ledgers and the identification of new ways to gain efficiencies and revenues (next 10 years). Decentralized business models would be next to follow, but at the moment they are still fairly far out on the horizon (10+ years).
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Security

The incidence of cyber threats is increasing as is executive and board-level concern regarding the possibility of breaches. According to our 2014 EY Global Information Security Survey of 1,825 technology leaders, the top organizational threat reported to be on the minds of executives was cyber attacks to steal financial information. This concern has caused many technology leaders to place a great deal of emphasis on technologies that help with authentication and authorization, as well as fraud detection and prevention. Also on the list of top concerns were worries around account takeovers, social engineering, hacktivists and the like.

In market, we are seeing the uptake of technologies that have been around for a while, such as tokenization and biometrics. Virtually all of the major standards and connectivity technologies mentioned above rely heavily on tokenization as a means of security. Biometrics which have come and gone before (e.g., Pay by Touch) are now re-emerging as easy to access authentication features for mobile payment solutions such as ApplePay.51

Additionally, there have been a number of new technologies on the scene as well. A notable one is Bluefin, the first US-based company to receive PCI validation for its PayConex product, that encrypts credit and debit card data in a secure point of entry device before it is transmitted into a merchant’s POS, preventing clear-text cardholder data from reaching the merchant’s system and networks.

In the security space we have been especially active with clients in working on authentication, fraud prevention, detection and response. One particularly exciting area of engagement in the cybersecurity space has been in the area of using dynamic graph theory to detect threats and potential breaches. Commercializing a technology developed at the Los Alamos National Laboratory (LANL), EY is actively working with clients earlier in the kill chain to detect anomalies and respond to intrusions. We expect this level of intelligence in the security space to continue to accelerate and are even finding other use cases where this type of mathematical science can be applied to address anomalous market issues.
## Section 7
Continuing regulatory scrutiny and standards development

Regulatory scrutiny and standards development are considered here together because they both set the “rules” by which banks and other financial service companies play. In the case of regulatory “rules,” we have included a round-up of the top issues and rules focused on by regulators. In the standards discussion, we look at the key areas where new operating “rules” are being looked at, many of which could be quite market-changing.

### Regulatory (regulations and regulators)

Banks have been caught up in a regulatory maelstrom for the last several years, with less and less ability to fund innovation. This looks to be a continuing prospect for the banks, where heightened regulation and oversight are emerging as the new normal. We expect this to continue for the foreseeable future in traditional banking domains. For innovators currently flying under the regulation radar, we expect a lot to change. Regulators are already taking notice and increasing their scrutiny of the larger companies in this competitive set. We expect this to come into greater focus (e.g., more scrutiny on money transfer licenses, anti-money laundering practices) in the near future.

Some of the key regulatory areas where we expect continuing and enhanced focus include:

| **Consumer Financial Protection Act** | The Consumer Financial Protection Act (Dodd-Frank) introduced a range of major regulatory changes, including the creation of a new regulator (CFPB) for consumer financial and payment offerings, new requirements around resolution and recovery planning, and a number of new changes affecting debit card interchange and routing. |
| **Personal Data Notification and Protection Act** | The proposed Personal Data Notification and Protection Act in the US requires any business involved in interstate commerce that collects personally identifiable information of more than 10,000 people to notify the individuals and the press within 30 days of discovering a data breach. |
| **Electronic Fund Transfer Act/Regulation E** | Regulation E provides a basic framework for participants in electronic fund transfer systems, such as:  
  - Automated teller machine transfers  
  - Telephone bill-payment services  
  - Point of sale (POS) terminal transfers in stores  
  - Pre-authorized transfers from or to a consumer’s account (such as direct deposit and Social Security payments) |
| **Federal Financial Institutions Examination Council (FFIEC)** | The FFIEC is the regulatory reviewer of US operations for data integrity, security, and operational requirements and standards. |
| **Foreign Corrupt Practices Act (FCPA)** | This is US anti-bribery legislation and other bank-related legislation aimed at knowing the customers, identifying risk and stopping criminal activity. AML, KYC and anti-terrorism efforts are becoming increasingly important. The regulations affect nonbanks as well as banks, and include nonbank technology companies entering the payments space. |
| **Interchange Fee Regulation** | The Interchange Fee Regulation puts a cap on individual interchange fees. Instead of a cap on individual debit card payments, this installment suggests the 0.2% cap could represent a weighted average of all payments made in a year. |
| **Payment Card Industry Data Security Standards (PCI DSS)** | The PCI DSS is a set of requirements designed to ensure the safety of data that is processed, stored and transmitted, including the card number (primary account number (PAN)), the cardholder name, expiration date and service code, as well as full magnetic stripe data and personal identification number. |
| **Truth in Lending/Reg Z** | Regulation Z is part of the Truth in Lending Act that requires complete disclosure of lending terms, including interest rates charged on credit cards. |
| **Unfair, Deceptive or Abusive Acts and Practices (UDAAP)** | The UDAAP regulation protects consumers under the Truth in Lending Act, stipulating that banks cannot (except under limited circumstances) increase the rate on a pre-existing credit card balance (except under limited circumstances) and must allow the consumer to pay off that balance over a reasonable period of time. It also regulates how banks apply payments, impose interest charges, address subprime credit and regulate disclosures. |
As regulations have changed and innovators have taken alternative routes (e.g., operating as marketplaces, no bank charters, money transfer licenses), we are increasingly being called upon to help banks structure their regulatory response programs and responses to matters requiring attention (MRA). We believe that the trend toward greater regulation will continue for the foreseeable future.

Accordingly, we are applying greater use of technology. For example, instead of sampling populations, we can now use technology and advanced analytics to review entire populations and help regulators and banks more completely comply with rules and regulations. Additionally, we note an increase in clients asking for help in the governance arena internally. While often onerous, we are seeing that regulations can provide additional security and even enhance the customer experience when done well.

Standards

Standards have always been critical to the payment ecosystem (Visa, MasterCard, ISO, EMV). Activity to drive out costs, increase security and update the aging payment infrastructure is already underway across the globe. Some of the key areas currently being looked at include:

<table>
<thead>
<tr>
<th>Bank payment obligation</th>
<th>An irrevocable undertaking given by one bank to another that payment will be made on a specified date after a specified event has taken place.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basel intraday liquidity norms and reporting</td>
<td>The implementation of intraday liquidity norms, allowing for same-day settlement of funds, is expected to be completed by 2017 in the US.</td>
</tr>
<tr>
<td>Europay, MasterCard and Visa (EMV) adoption in the US</td>
<td>As of October 2015, the major credit card networks (Visa, MasterCard) created a major liability incentive shift to drive EMV adoption at the physical POS. As of that date, liability for counterfeit fraud transactions at the physical POS shifts back to merchants that do not deploy EMV-capable terminals. Many large retailers were able to meet this deadline, but smaller banks and many retailers have yet to migrate to EMV.</td>
</tr>
<tr>
<td>Immediate payments Faster payments Same-day ACH</td>
<td>With real-time payment systems beginning to be implemented across the globe, the US Federal Reserve has published a consultation paper on immediate payments implementation. The national Automated Clearing House (ACH) is moving toward faster payments by opening up two new additional windows for ACH payments during the day.</td>
</tr>
<tr>
<td>ISO/IEC 2022</td>
<td>The ISO/IEC 2022 standard was developed as a technique to represent characters in multiple character sets within a single character encoding, and to represent large character sets so as to accommodate languages with greater character-set needs.</td>
</tr>
<tr>
<td>Payment security technology standards</td>
<td>Many emerging technologies, such as near-field communication (NFC) mobile payments, tokenization, biometrics and mobile point of sale (mPOS) systems, are being implemented by tech firms and banks alike to offer a more seamless and convenient experience for users.</td>
</tr>
</tbody>
</table>

Collectively, the attention currently being placed on standards is highly important. The reality is that, worldwide, we have an aging payment infrastructure and tremendous friction in the system. More effort will be focused in this area in the years to come as new innovations and technologies (e.g., blockchain) are explored as mechanisms to drive further market efficiencies.
The payments revolution ... are you in?
Section 8
Closing thoughts

We believe that the trends covered in this paper represent exciting drivers for growth in electronic payments as both challenges and opportunities for traditional financial services players. To take advantage of these market-transforming trends requires a strong end-to-end understanding of consumer behavior that aligns with the full value chain around payments, not just the payment transaction itself. For banks and nonbanks that understand key customer pain points and experience “delighters,” there are opportunities to partner with a broader ecosystem of players to provide integrated, and high-value-added, offerings and solutions.
Cash and inertia

The biggest barrier to changing payment behavior stems from the simple fact that cash is still king. It is easy to use, widely accepted and ingrained in our psyche as having value. There is more than US$1 trillion in cash in circulation globally. Compared with the total noncash volume of US$358 billion globally, other forms of payment pale in comparison. And noncash payment forms (ACH, checks, other direct deposits, credit transfers, credit cards, debit cards, stored value cards) have taken a long time to get to the levels they are at today. In fact, it took credit cards nearly 50 years to reach current levels.

That said, noncash payments have been growing at 7% in the last several years. Visa estimates that the 68 million places that accept cards today will expand to 80 million in five years, with much of the growth being in mobile point-of-sale transaction volume. Mobile and any other solutions that target small, low-value payments clearly have an opportunity to drive lower cash usage, especially in developing countries where financial service and telecom infrastructures have long been a barrier to card acceptance and real-time authentication.

With headwinds and tailwinds both in play, it is important for today’s financial service providers to move quickly to be seen as relevant; however, as noted, the pace of consumer adoption also allows a window of time to line up resources and craft the right strategy for the future. And that is where thoughtful, strategic banks will capitalize.

Being part of the change

We believe that there are a number of things you should do to position your company for future success. First, insist on a clear value proposition for your consumers. Consumers and merchants need to see a very significant personal benefit to changing — psychologically and financially. This includes the products you sell, the value you add, the customer experience, your omnichannel strategy and the partners in your ecosystem. Second, supercharge your marketing and product configuration with all the power of insight and advanced analytics. Marketing that will help move the needle will need to be deeply anchored in insight and provide the social proof, step commitments and significant value. Third, solidify your innovation strategy. No matter how you participate, you need to reserve your right to play and align your brand with what your customers value. Fourth, get your infrastructure in order. New technologies and aging legacy infrastructures are problematic. Both for efficiency and security, invest for the future. Finally, recognize that regulation is part of doing business and structure accordingly.

In the end, it is important to act versus admire the changes happening all around us. Your road map will set direction and give your troops the ability to maneuver effectively on the ground. And finally, consider change in a way that is appropriate and genuine to your organization. In the end, differentiation is critical, and the territory that you stake out needs to be uniquely yours.
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