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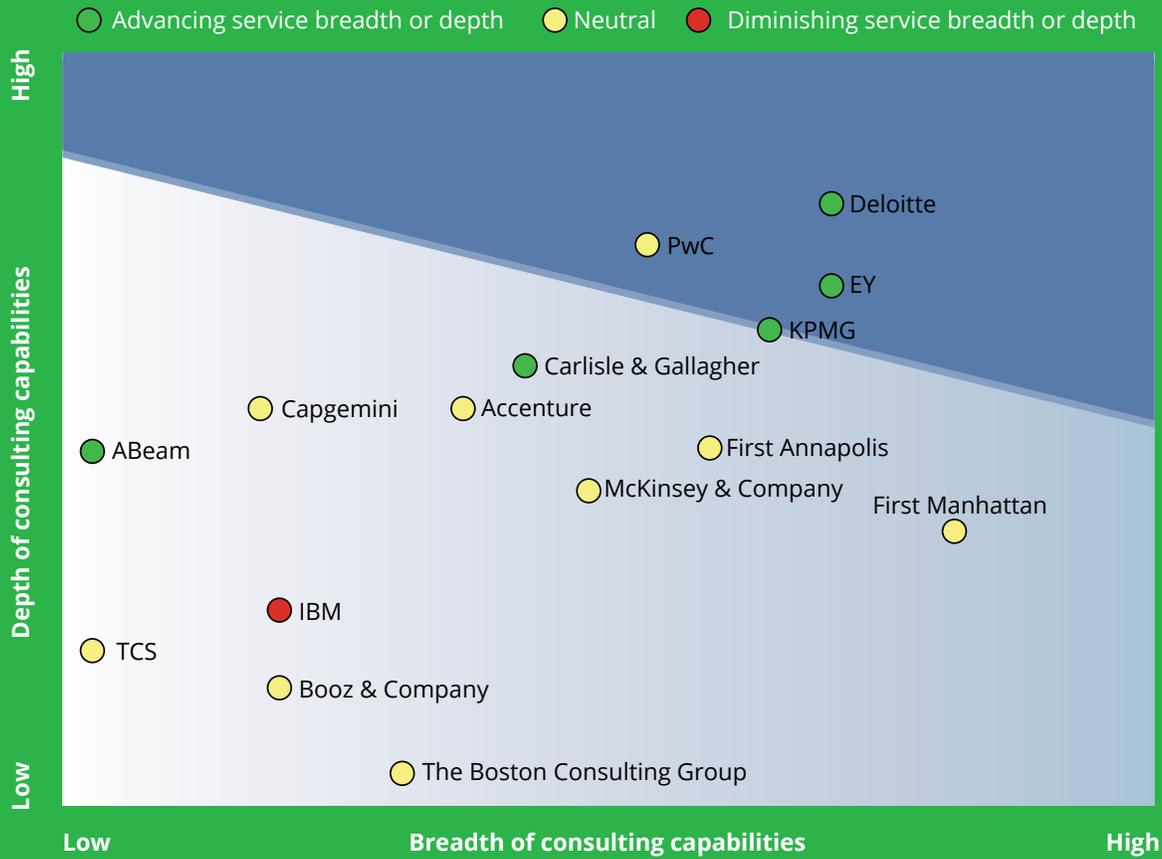
Collision or collaboration
What's on your payments radar?

10th edition

“As some clients try to develop cross-border strategies, Deloitte is one of only a handful of firms with truly global capabilities.”

ALM Intelligence

ALM Intelligence (formerly Kennedy Research & Advisory)
assessment of cards and payments consulting providers



Foreword

Collision or Collaboration – what's on your payments radar?

Globally, payments is at a pivotal juncture: one that we anticipate could result in collisions if the traditional players do not seek out opportunities for collaboration.

Payment solutions continue to present an opportunity for growth, rapid innovation, and are introducing new (and riskier competitors) with faster, more efficient and effective payments services.

Over the past 12 months the payments industry has also seen a dramatic increase in the number of opportunities to form and join alliances with brick and mortar partners, as well as fintechs, to compete with the most threatening disrupters. We believe to not act and go it alone presents the risk of collision with those same players as well as the disrupters who have significant advantages of scale and modernized technology.

We applaud our clients who have made bold moves to address these needs and customer journeys. Our clients across the hospitality, energy, media, and technology industries have lead the way, enabled by their financial institution partners. And Deloitte has been honored to help each of them translate their visions into practical, scalable solutions, including payments-enabled connected vehicles and journeys that span air, rail, and shared automobiles. For these players there is a great deal to be optimistic about over the next 18 months. Now banks must evolve to serve this new era and capitalize on the opportunity to develop stronger merchant and consumer value propositions.

We are pleased that ALM Intelligence (formerly Kennedy Research & Advisory) named Deloitte the global leader in Cards & Payments based on breadth and depth of consulting capabilities in their Consulting to the Banking Sector: Cards & Payments report. Deloitte also ranked #1 for Cards & Payments Consulting globally based on revenue and market share.

On behalf of the payments leaders from each of the markets our network of member firms represents, we hope you find these insights and our Payments Radar helpful as you navigate through the change, deciphering the threats from the opportunities. We invite you to compare your individual readiness to our index of payments threats and opportunities by visiting the following assessment tool.

Please reach out if we can help you think through these opportunities and threats.

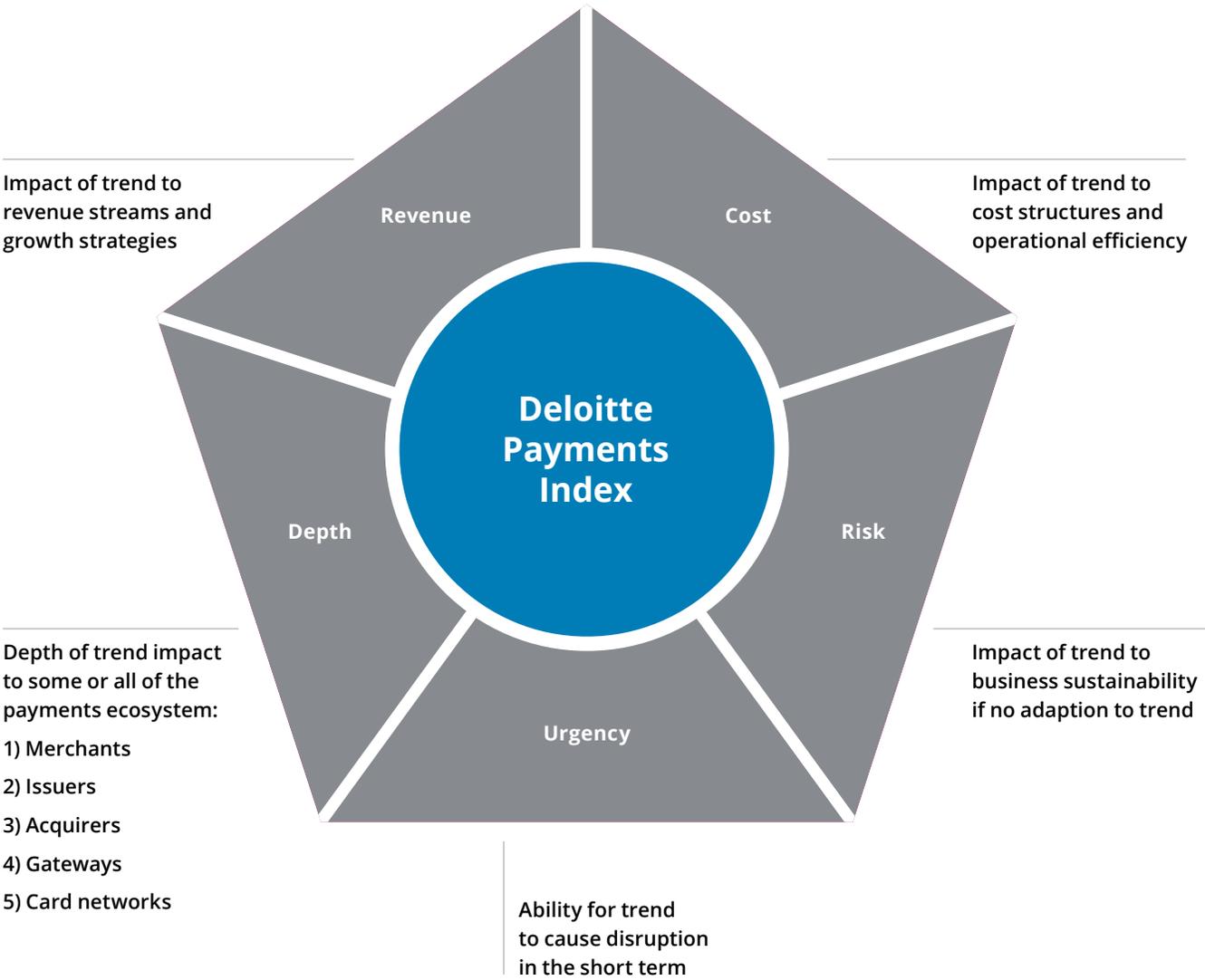
Best regards,



Brian Shniderman
Deloitte Payments Practice Leader
Mobile: +1 602 738 7600

Your radar—The Deloitte payments index

In recent months, we have found our clients to be highly uncertain, and largely unprepared, to address the current environment. In any uncertain market, properly anticipating trends is a prerequisite to planning an effective response strategy. Since 2007, we have published a series of articles that address the existing challenge of the global retail payments environment. The Deloitte payments team actively tracks, evaluates, and prioritizes payments industry trends using more than 25 business and technology elements and a database of market factors. We grouped these elements into the following five key dimensions to form the Deloitte payments index, which we use to assess each trend:



Deloitte Payment Index scoring methodology— What it means to you

• Revenue

– A higher score indicates a negative impact to revenue in the long term if steps are not taken to adapt to the trend. For example, choosing to not modernize your payments platforms may result in a customer segment leaving for competitors, thus impacting revenue

• Cost

– A higher score indicates an increase to cost structure in the long term if steps are not taken to adapt to the trend. For example, choosing not to modernize and invest in fraud protection capabilities may lead to higher legal costs

• Risk

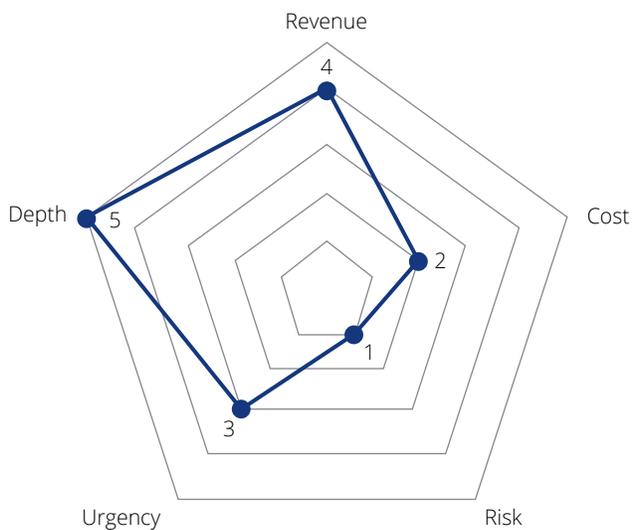
– A higher score indicates a negative impact to business sustainability in the long term if steps are not taken to adapt to the trend. For example, choosing not to modernize platforms may result in long-term revenue leakage and a higher cost structure, leading to reduced profitability

• Urgency

– A higher score indicates that the trend will materialize in the short term (12–18 months) versus a longer term and may cause large disruptions to the current payments landscape

• Depth

– A higher score signifies that the trend may impact the majority of the payments ecosystem



— Degree of impact



Find out where you stand on the
Payment Index, take the survey here:

[https://deloittesurvey.deloitte.com/
Community/se/3FC11B264FA57065](https://deloittesurvey.deloitte.com/Community/se/3FC11B264FA57065)

Impact of key trends

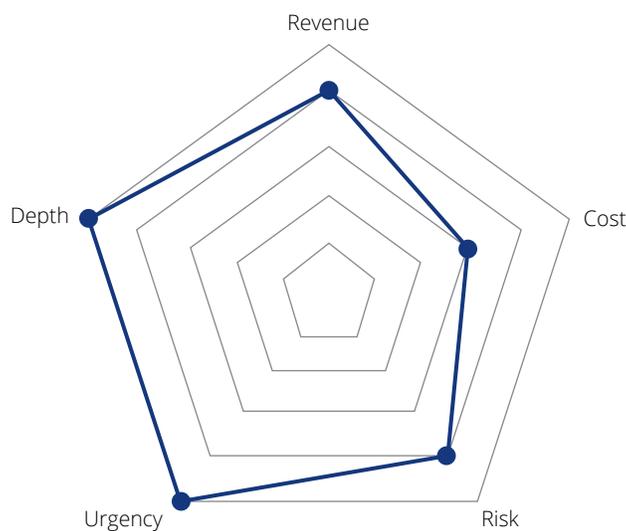
Over the next 18 months, we anticipate the following trends will be among the most significant in defining and changing the payments industry.

Organization

Merchants

Compelling new payments alternatives and e-wallets like Venmo, ApplePay®,¹ Alipay, and Ripple are emerging from startups and nonbank competitors, upending traditional payments ecosystems and experiences. Organizations are recognizing the need to own or enable easy integration with new e-wallets, cryptocurrencies, and mobile solutions, which are nimble and offer creative payment options to remain competitive in the face of emerging alternative threats. The migration entails digital products, channels, currencies, identities, and risks and requires increasing cooperation between fintechs and traditional players to bring seamless, resilient solutions to market.

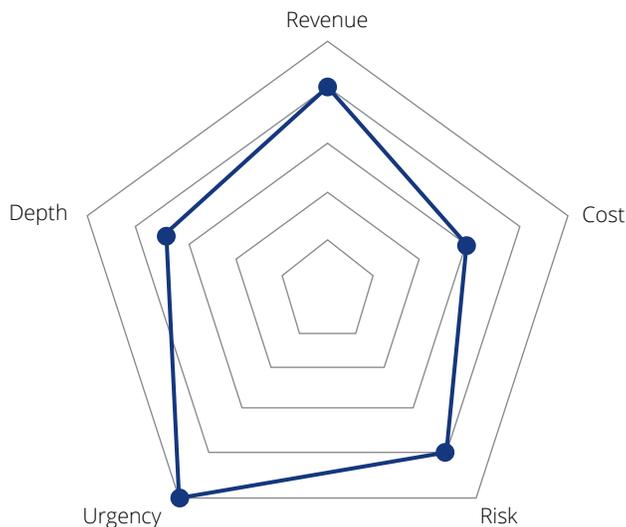
The rise of digital and alternative payments— Be prepared or be disrupted



Innovative entrants to the payments ecosystem make up 35 percent of all new financial technology firms and are changing not only the way merchants use technology to process payments but also the ways in which they drive customer engagement and, ultimately, satisfaction. Contactless technologies such as Apple Pay, Google Wallet, Samsung Wallet, and Android Pay in-store as well as frictionless initiatives out of store will continue to gain traction. As a result, merchants will seek solutions offering these innovative functionalities in order to further utilize payments as a value-add, enhancing customer satisfaction and retention.

Consolidation and optimization of currently divergent payments processes and systems may be a major emphasis as organizations seek cost containment, as well as greater product flexibility and revenue enhancement. Forward-thinking payments providers will likely look to establish an enterprise payments system—leveraging technologies to establish payments hubs—which may drive down processing costs, help create shared services, and facilitate the development of new payments products.

The modernization of legacy payments environments is underway



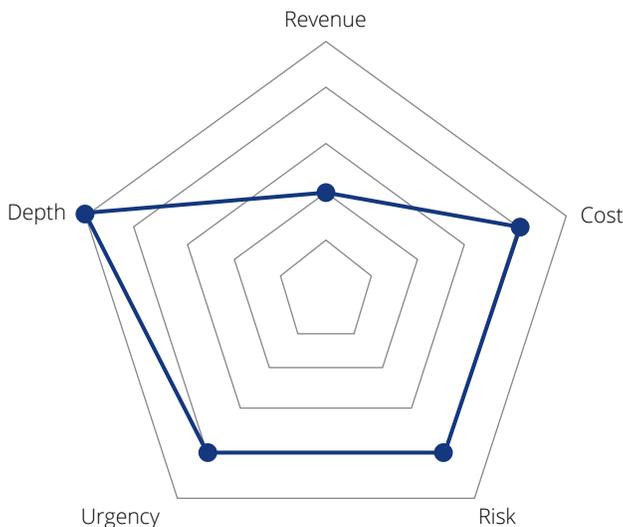
Increased merchant adoption of cloud and mobile-enabled, full-service software solutions is radically changing how merchants engage with customers and is driving down processing costs. As merchant-facing payments services move from simple payment processing to true payments, analytics, and POS solutions, we expect additional consolidation with upstream players, additional optimization of the services offered, as well as reduced costs for merchants.

Wallet consolidation is also expected as result of maturing customer and merchant expectations.

Organization	Merchants
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Banks are realizing that APIs can solve industry issues like credential sharing and manual data exchange. With the increased competition that major financial institutions are facing from up-and-coming fintechs, open APIs will provide collaboration opportunities to financial institutions to improve the quality of financial services. With the Revised Payment Services Directive in 2018 in the European Union, banks will need to offer open banking services by working with fintechs.

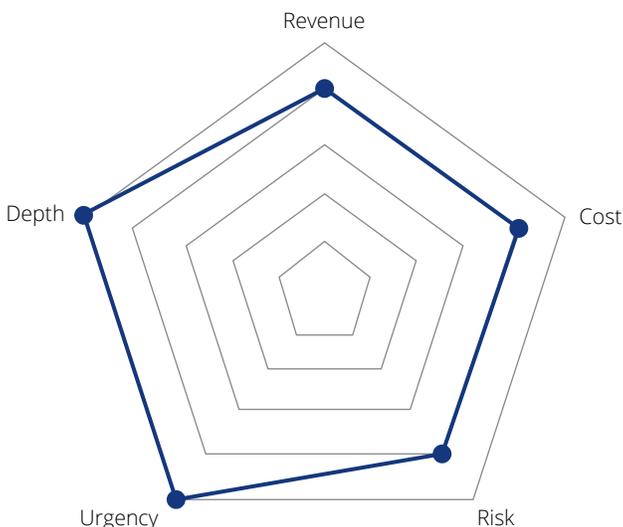
Open APIs are driving collaboration between major financial institutions and fintechs



API solutions will help financial institutions and fintechs create products for merchants of every size to drive down transaction costs. Combined with the other breakthroughs in payments, like machine learning, open APIs will increase cybersecurity to mitigate risks for businesses. Fintechs are driving financial institutions to adopt better technology practices by collaborating on APIs together. The services financial institutions will be able to provide to businesses include ACH processing, budgeting tools, and lending products.

The significant industry changes and the underlying challenges brought on by financial and regulatory reform and nonbank competition will likely continue to feed the need for scale and innovation in the drive toward healthy growth. Low valuations and appetite from private equity firms, large incumbents and new entrants alike will continue to play a significant role, changing the dynamics in the industry, and infusing capital and energy into the system, while also introducing new types of risk.

M&A is shaking up payments



As new entrants aggressively seek merchant relationships, we expect lower processing costs for merchants. And, as traditional terminal-based providers purchase or partner with upstream players and as issuers/acquirers seek new ways to engage with merchants downstream, we expect margin compression yielding lower processing rates for merchants as a result.

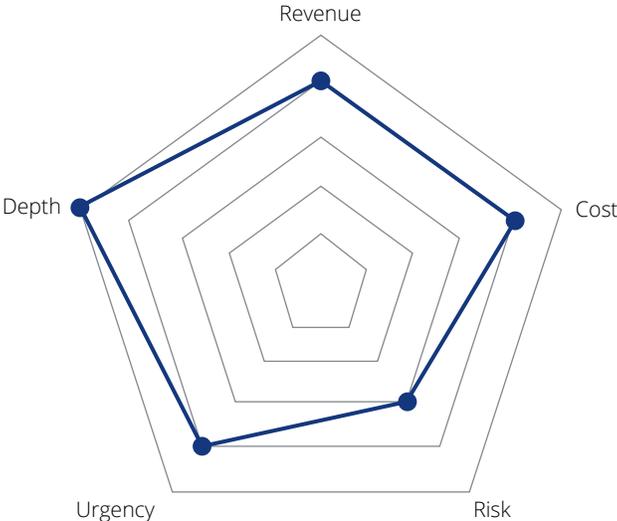
Also, as middle market issuers' needs change in light of the evolving payments landscape, large issuer banks will seek to leverage their position in the market to generate additional payments revenue via agent bank models.

Organization

Merchants

Acquirers are positioning themselves to take a dominant role in emerging global B2B e-payments in high-growth verticals. New gateways are emerging to fill unmet needs across untapped industries, leading to increased ease in conducting cross-border and cross-industry transactions. This will be done by removing hurdles associated with international B2B payments, reducing costs, and simplifying processes that, combined, enable members of the value chain to better communicate, exchange data, and accelerate growth. Digital payments also enable far greater metadata to be sent along with the payment.

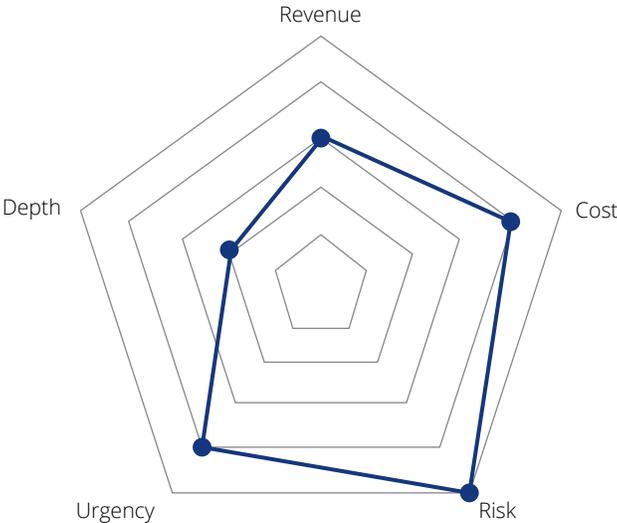
Thinking global and high-growth verticals



Acquirers will continue to look downstream to remain competitive and offer value-add services beyond payment processing, benefiting merchants in the form of lower costs and enhanced product offerings. Acquirers in pursuit of new, typically customer-facing disrupters will seek to offer POS and cloud-enabled, omnichannel solutions, analytics capabilities, and other downstream services in order to retain market share and advantageous pricing.

A move to real-time systems globally has contributed to an environment in which consumers, merchants, and organizations expect ability to transact securely. The new standard is driving change for traditional FOPs, credit, debit, prepaid, etc., as consumers expect faster settlement, notifications, and consolidated reporting. The growing ubiquity of smart devices, e-commerce, as well as innovation in P2P, are also driving adoption of real-time payments.

Faster and real-time payments are catching on globally

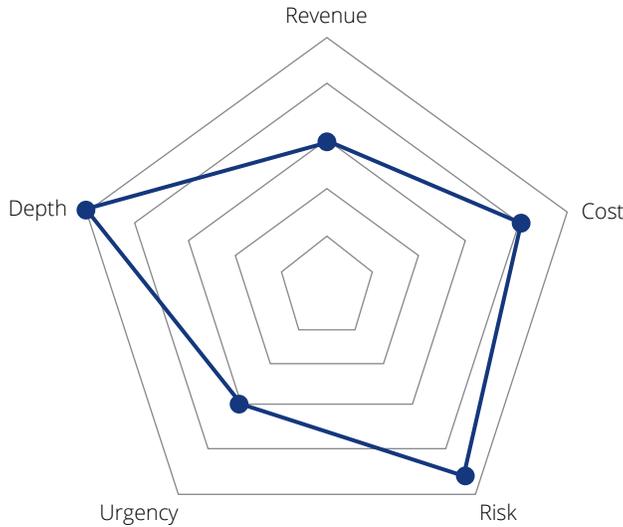


The mass movement to real-time payments is quickly gaining traction both globally (35 countries have adopted a form of real-time processing and settlement) and more recently in the United States. As NACHA and regulatory priorities evolve (such as the Fed's recommendation to accelerate adoption of ISO 20022 in the US), merchants have come to expect both faster processing and settlement speeds, further accelerating the move to real-time payments. Merchants stand to benefit from faster payment execution and settlement through optimized liquidity as real-time payments become reality. Further, merchants will continue to prioritize payment rails offering not only greater speed but also efficiency in the wake of change.

Organization	Merchants
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Interoperability and consumerization will likely be the primary focus areas of an evolving business payments ecosystem. Leaders will create B2B experiences that resemble B2C across multiple channels and move more aggressively toward the virtual payments space as industries and transactions shift away from paper products. Businesses and financial institutions will also recognize the flexibility virtual payment solutions offer, including opportunities to address payment pain points between various actors along the payments value chain, and will gradually migrate toward electronic payment forms.

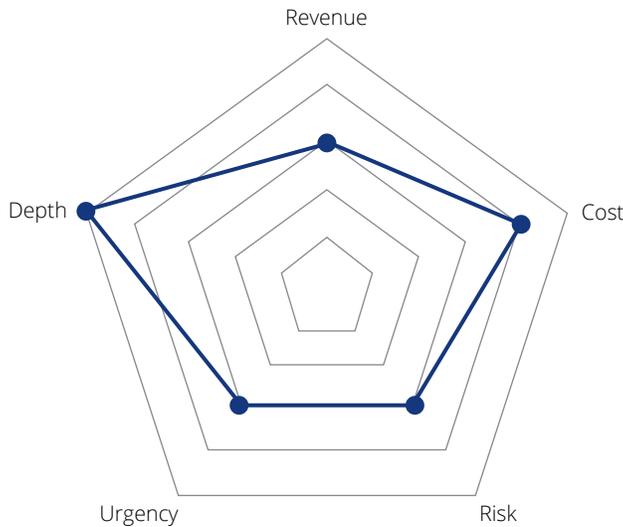
B2B payments catch up to consumer tech



As innovative, software-driven entrants continue to focus on engaging merchants, merchants with B2B and G2B needs stand to benefit greatly, not only from faster and more secure digitally enabled and optimized payment processing, but also from reduced fees as increased competition in the space continues to bring transparency to pricing.

Merchants moving toward mobile POS, mobile payments, and contactless solutions will put additional strain on issuers. As merchants move to systems that prioritize speed and ease of use such as rapid in-app mobile payments or contactless-enabled POS, customers are less likely to pay attention to their card issuer (result of rapid growth of “invisible payments”). Going forward, issuers will look for new ways to build and incentivize customer loyalty which will undoubtedly entail courting merchants directly.

The shift toward mobile and “invisible payments”

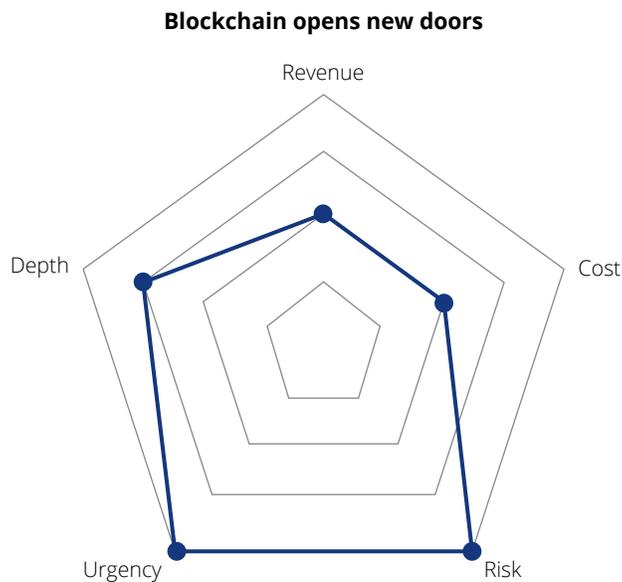


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Organization

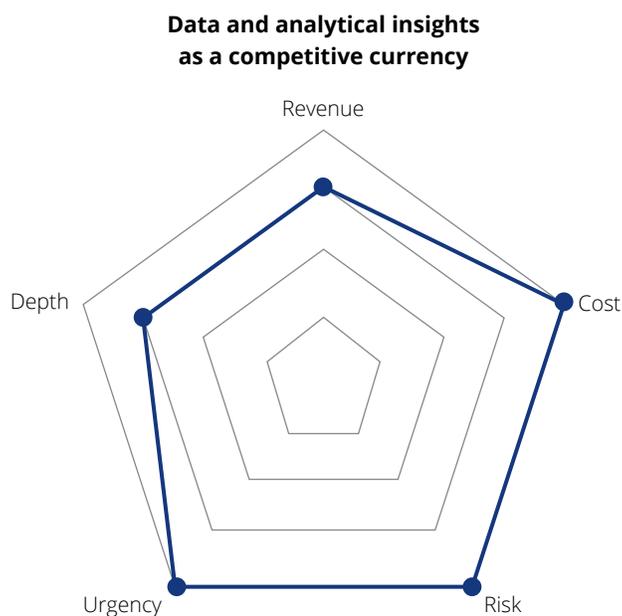
Merchants

Banks and leading financial institutions, such as Standard Chartered, Barclays, UBS, Citibank, and Deutsche Bank, are increasingly looking to adopt blockchain technology to help streamline costly and risky cross-border transactions, reduce operating expenses, increase visibility and transparency across multiple parties, and secure real-time settlements. Issuers are recognizing the benefits of distributed ledgers in rendering payments processes more efficient, and are shifting from cautious interest to exploratory proofs of concept.



While the popularity of bitcoin wanes, merchant adoption of POS or payment processor solutions enabling cryptocurrency acceptance will stabilize and only gain traction for certain Card Not Present merchants. However, as fraud liability increasingly shifts to merchants in light of the national adoption of EMV, we foresee that payment processors, gateways, and POS solutions catering to merchants will seek to emulate issuers and financial institutions and develop blockchain-enabled solutions.

Data Monetization: Analytical architectures have tracked detailed customer interactions and payments, which provides the foundation to derive distinctive insights. Financial institutions and payments organizations can apply these insights to provide a tailored, compelling customer experience across channels. Delivering these offers can reduce acquisition costs and increase spend by existing customers. Leading technology companies are developing platforms that package detailed transactional/behavioral data in a privacy-compliant manner, in order to distribute to trade partners. The evolution and standardization of these “data marketplace” ecosystems could compel payments firms to build out leading data management capabilities.

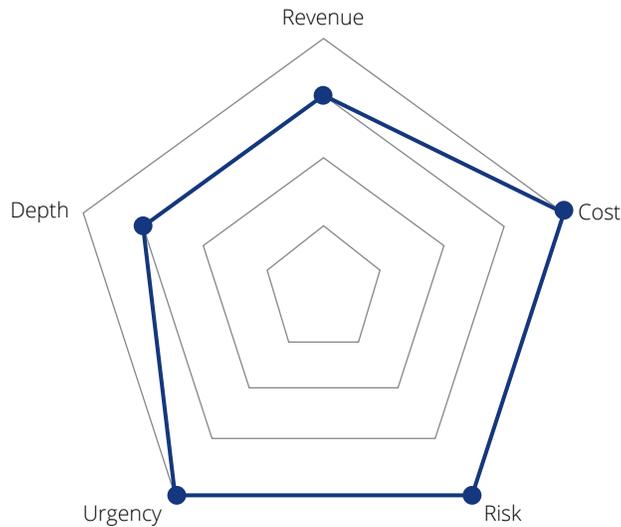


Dark Analytics: Buried within transactional, digital, log, and unstructured data lie critical strategic, operational, and customer insights that require analytics to uncover. By making meaningful connections between data across silos, and applying unstructured data mining techniques (e.g., speech transcription, text mining, video analytics, computer vision, etc.), stakeholders across the payments ecosystem can enable rapid, scalable analysis by tools already in their analytical architecture. Illuminating “dark data” enhances existing analytical models with previously untapped internal data, allowing more nuanced insights. The impact can be much more significant than augmenting model data with external sources alone.

Organization	Merchants
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The increase in computing power has allowed for fintechs to store, process, and ultimately analyze very large amounts of data. All possible data is collected and then patterns are drawn from the aggregate. Through collaboration with cloud-hosting providers, large amounts of data can be stored at cheaper costs. Methods are being developed to utilize this metadata to its fullest extent. Services like predictive ordering and customized searching are being put into production.

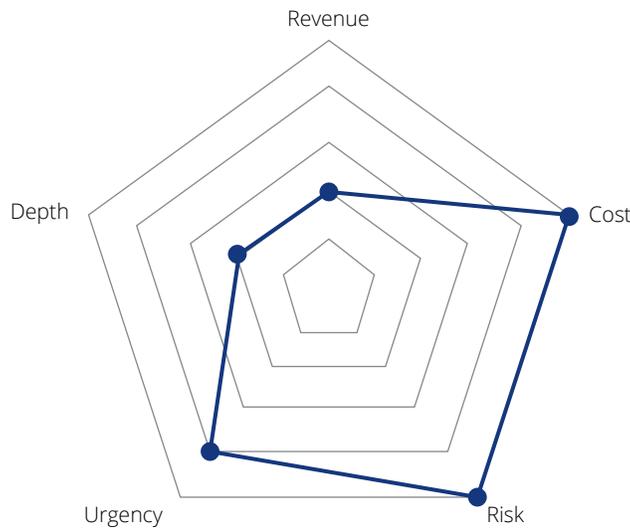
The ever-growing case for big data and advanced analytics in payments platforms



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As payments become increasingly seamless and agile across channels, security and authentication issues related to identity verification become further complicated. Aware of the growing threats, industry players are investing in EMV, biometrics, and real-time analytics to drive innovation in fraud detection. Issuers in particular are firmly establishing analytics techniques as part of a multilayered approach to combat data breaches and mitigate risk.

Fraudsters are becoming smarter



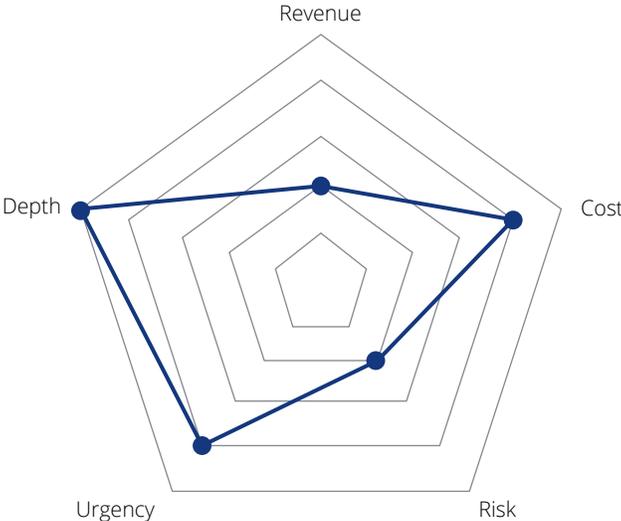
As fraud losses and data breaches continue to rise, security will remain a priority for merchants (revenue lost due to fraud up 33 percent). Data breaches are especially costly at the merchant level, where trust is imperative in ensuring customer loyalty and retention as well as in maintaining brand power. While EMV and other hardware upgrades will continue to ensure more secure payments, merchants will look to their POS software solutions to further mitigate risk.

Organization

Merchants

Businesses are projected to spend almost \$300 billion on IoT by 2020. A strong majority of consumers are attracted to the world of having connected devices and a streamlined life without many of today's hassles. Merchants will be able to adopt IoT infrastructure and software to integrate into their business operations. The services that will be provided are security, data analytics, and payment options. Companies are already integrating IoT into devices like phones, automobiles, appliances, and wearable technologies.

The Internet of Things is driving the world into the future



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Selecting a partner

Deloitte has one of the largest, most focused, and successful global payments teams in the industry.

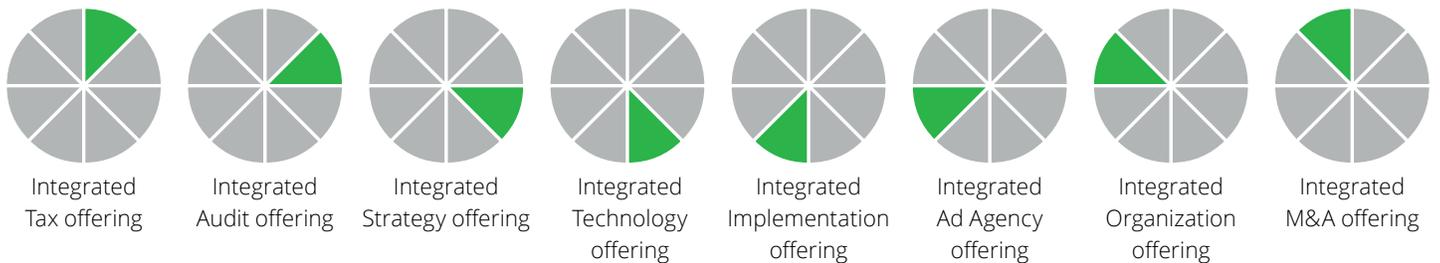
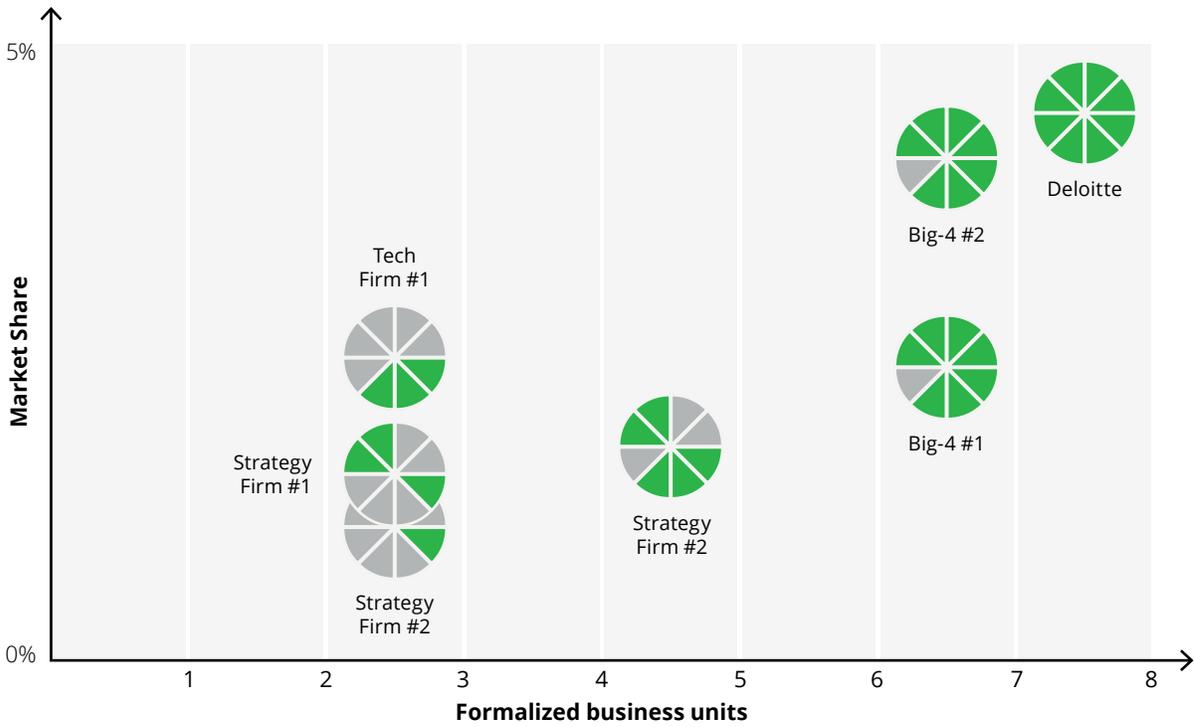
We rank the highest in terms of formalized business units as well as market share for Cards & Payments Consulting Providers by Client Spend.³ Deloitte brings a holistic approach through eight formalized business units, utilizing a cross-disciplinary team consisting of members from consulting, tax, audit & assurance, mergers & acquisitions, and risk and financial advisory services. This ability enables us to incorporate analysis and perspectives of payments issues,

rarely addressed by our competition, in our service offerings. For example:

- Tax implications to major card portfolio acquisitions
- Risk analysis associated with new payments regulatory changes
- Pricing implications from new market entrants

We have provided services across the full spectrum of payments-specific projects, covering virtually every major payments function and instrument.

Competitive landscape for payments consulting



Source: Deloitte research from public records

Deloitte has over 1,000 payments-trained individuals, working in 60+ countries across major regions. Through our global reach and collaborations, we have developed firsthand experience through interviews with overseas merchants and gained insight on processing systems, payments preferences, and trends in foreign markets.

Deloitte has team members specializing in strategy, operations, and implementation and execution, which distinguishes us from the competition for delivering executable strategy.

We also attract and retain highly talented senior leaders from top banks, card companies, successful fintech organizations, and leading strategy, operations, and IT consulting firms. Recent examples include:

1. Former CEO of a multinational credit card and payment services provider
2. Board member of a top three US financial institution
3. Former head of merchant sales and solutions of a global payments company

Deloitte is a dominant leader in serving the consumer business industry; as such, many of the largest US merchants served by the payments industry are Deloitte clients. We have also effectively delivered payments-related services for clients across the transaction activity chain, including:

- Most of the top 10 retail banks (based on DDA Net Interest Margin)
- Most of the top payments processors
- Eight of the top 10 card issuers and two of the top three debit card issuers
- Three major credit card networks
- One of the largest debit card processing networks and one of the largest third-party debit card transaction processors

Third-party recognition

Mobile Commerce Daily recognized Deloitte & Touche LLP as the Mobile Commerce Researcher of the Year.⁴

ALM Intelligence (formerly Kennedy Research & Advisory) recognized Deloitte as the largest global financial services consulting provider based on revenue.⁵

Our global organization

We have been recognized by industry analysts as the leading global financial services industry consulting organization for our cross-border execution.

Deloitte's Payments practice extends far beyond our US borders. We serve clients that have global reach and have pinpointed representative countries where we have a footprint.

Increasingly, the opportunities and threats in the payments industry transcend borders. As a result, it has become essential that our clients have an understanding of the inter and intra-country implications of their actions (or in many cases inactions). Recognized by industry analysts as the leading global financial services industry consulting organization for our cross-border execution, Deloitte's Global Payments practice brings deep market insights to our clients' most important projects, and leverages Deloitte member firms' 210,000 dedicated professionals in more than 150 countries.

Our global footprint in payments



Collective member firms collaborated to help four different countries with their real-time, faster, and secure payments initiatives

Representative joint efforts between Deloitte and its network of member firms around the globe

-  Canada and the United States worked together to execute a postmerger integration and PMO for a major processing platform migration.
-  United States teamed with a Global Merchant to implement a flexible and agile way for rolling out and adopting alternate payments, including: Alipay globally, PayPal in Europe, and Apple Pay in the US.
-  Mexico and the United States worked together to implement a merchant acquiring operation and advise on a commercial prepaid strategy for joint ventures and networks.
-  Brazil and the United States worked together to introduce a combined social networking and mobile platform to issuers and large financial institutions.

-  United Kingdom and the United States teams establishing an e-wallet license and go-to-market plan for issuer and network.
-  South Korea and the United States teamed to provide mobile payments strategy for a global manufacturer and a large automobile company.
-  China and the United States developed a mobile payments platform and joint ventures for networks.
-  Australia and the United States worked together to assist a leading financial services organization to develop a target operating model, and devise the product, market and technology strategy to transform the organization's business based on the changing financial services landscape.



Our payments offerings

Deloitte embraces and integrates across three client engagement models:

- **Advise** clients as they navigate increased complexity, enabling them to make superior decisions
- **Implement** flawlessly to help clients build new capabilities through critical infrastructural and systems investments
- **Operate** increasingly high value-added elements of our clients' businesses to deliver measurable results in a new way

As such, Deloitte's payments offerings consist of end-to-end capabilities that very few can offer.

See below for a selection of our key payments offerings:

1. Payments strategy and organizational design
2. B2B, vertical, and cross-industry growth
3. Digital wallets and payments experiences
4. Modernized and faster payments platforms
5. Payments innovation, blockchain, and AI
6. Loyalty, rewards, and trade promotion
7. Financial advisory for payments
8. Tax for payments
9. Audit for payments



1

Payments strategy and organizational design

Defend against disruptive providers and find opportunities through organic and inorganic moves with the required operational change

Key offerings

- Digital bank strategy and design
- Payments due diligence
- Post-merger integration
- Maturity model assessments
- Operations simplification and process improvement
- Payments vendor assessments

Deloitte Digital Bank

Digital banking is about getting back to basics, connecting people and money to make life happen.

Our Digital Bank solution is about delivering the “art of the possible” through a forward looking, customer-focused vision. It is a scalable and high-performing core account and digital identity platform that can significantly reduce cost of delivery, improve customer experience, enable a future digital-only bank, and provide flexibility for the future. Deloitte's Digital Bank offers proof of concepts, prototyping, and product development capabilities.

Why a Digital Bank?

The culmination of a number of internal and external pressures are driving the need for a Digital Bank, including:

- Customers have become more sophisticated with their acquisition and use of financial service products
- Regulatory changes have opened markets and opportunities (e.g., access to payment switches from nontraditional players—mobile operators, technology firms, retail stores' personal finance platforms)
- Continuous pressure on cost for traditional banking providers

The Digital Bank's design operates under a core set of design principles, with an emphasis on simplicity, including:

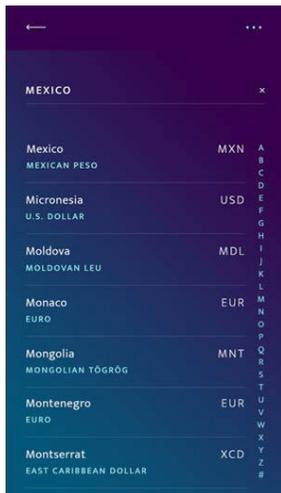
- Design for “usefulness: Design principles that not only ensure quality but also deliver products, services, processes, and functionality useful to both the customer and the bank. Remove complexity and “process waste.”
- Digitally enabled: Embrace recent technology advancements (web, social, video, public cloud, mobile, and modern core componentized banking platforms) to deliver an improved anywhere, anytime customer take-on and service through an automated self-service digital experience.
- Banking anywhere, anytime: Fully automated acquisition, service, and closure processes to improve cycle times, drive down operational costs, and improve overall effectiveness and usefulness.

Payments processing is core to the design of the Digital Bank, especially around:

- Performance and scalability: Efficient scalability is essential for competing in today's digital environment. The Digital Bank provides effortless and rapid scalability without an exponential increase in cost
- Frictionless processing: The Digital Bank allows for efficient processing in light of its seamless user interface, removing friction from each transaction
- Automation: Fully automated acquisition, service, and closure processes to improve cycle times, drive down operational costs, and improve overall effectiveness

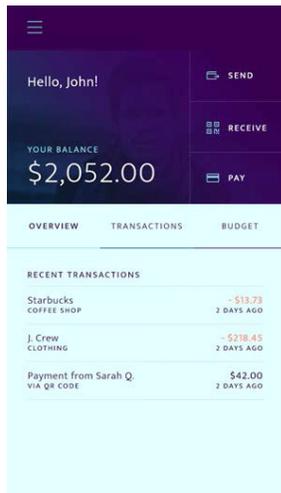
The Digital Bank radically transforms the relationship between people and money, relying on a customer-centric user experience, and nimble architecture in anticipation of a radically changing industry.

See below for a sample of Deloitte's Digital Bank prototype offering in action:



Currency search

Ability for instant/micro-cost of cross-border payments



Account home

Reimagining a banking “account” to be simple and intuitive



Recipient search

Frictionless payments in or out of the Digital Bank network sent by phone or social media contact information



Voucher in wallet

Wallet and loyalty in one location make payments at merchants easy

2

B2B, vertical, and cross-industry growth

Strengthen B2B and cross-industry verticals through partnerships/alliances and cross-industry payments solutions

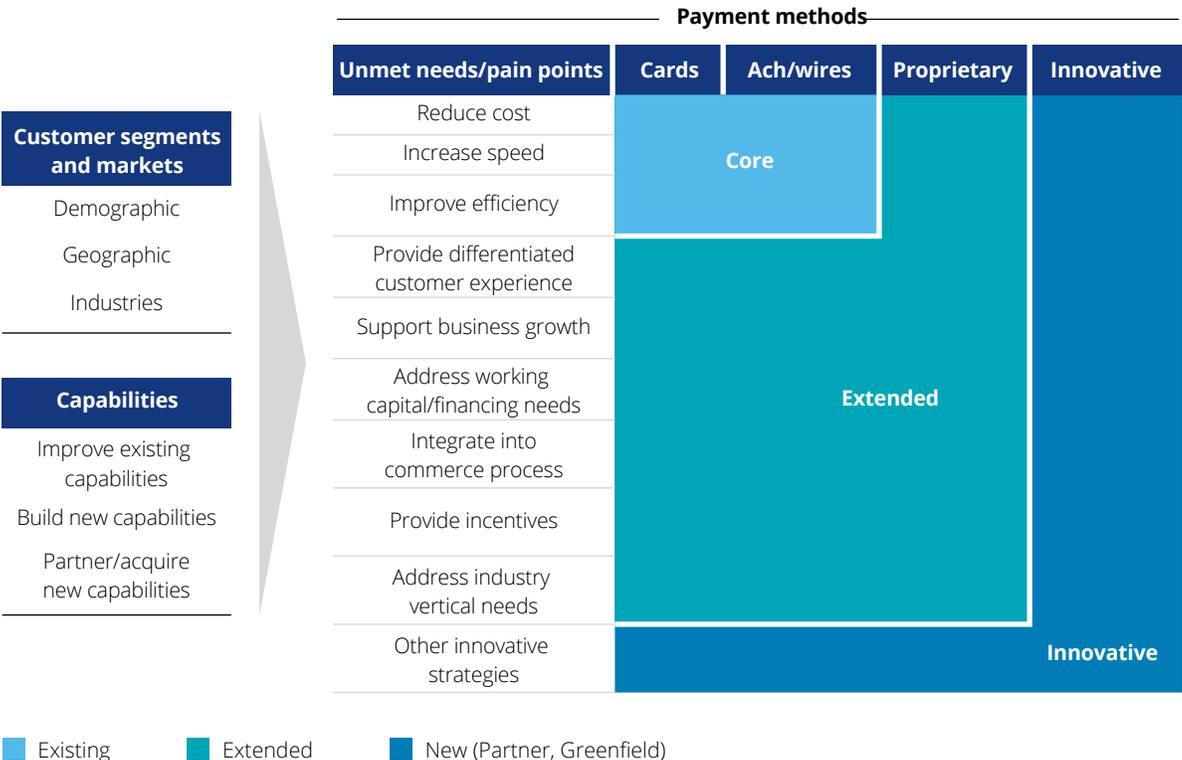
Key offerings

- Partnerships and alliances (e.g., co-branding, M&A, etc.)
- B2B payments solutions and strategy
- Cross-industry e-wallet
- AR/AP automation
- Platform blueprinting
- Execution, implementation, and managed services
- Fintech integration
- Marketplace assessment
- Payments platform modernization
- Payments vendor selection
- PCI compliance and risk assessment

B2B payments market is a significant untapped opportunity

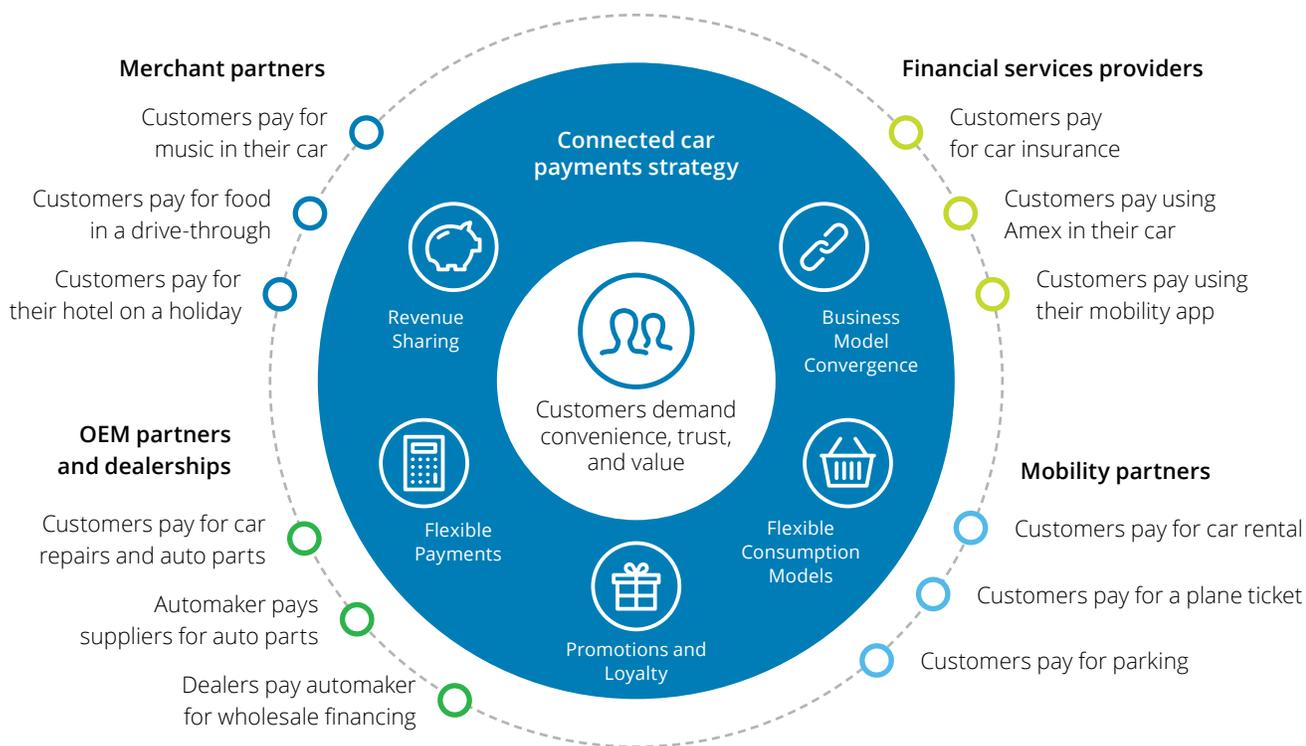
B2B payments represent a large and fast-growing market that has not yet received the same degree of focus from financial institutions as that of business-to-consumer (B2C) payments. In particular, the US middle market is a key sector of the economy and grossly underserved in its payments needs. Deloitte's strategy planning framework for B2B payments helps financial institutions identify ways to develop an enhanced value proposition based on the pain points and unmet needs of middle market players.

For more information, refer to Deloitte's white paper on "B2B payments for the middle market: Addressing unmet needs to tap into a new pathway for growth."⁶



The connected car—A truly mobile wallet

With connected vehicles entering the mainstream, recent technology developments and consumers' desire for frictionless payments have created an opportunity for automakers to act as a primary value driver in the mobility ecosystem.



Deloitte has demonstrated experience designing and implementing mobility payments strategies and solutions. We bring key capabilities across consulting, financial advisory, tax, and accounting to the table to help automotive clients address the following questions:

1. Which payment methods should be enabled?
2. What is the optimal payments business model? (i.e., merchant of record options)
3. What monetization opportunities are available, and which ones should be prioritized?
4. What are the risk and regulatory implications given the chosen business model?
5. What are the tax and accounting considerations given the chosen business model?

Deloitte has also published numerous white papers on the topic of connected cars and is a leading presence in the automotive industry, providing services to more than 80 percent of the Fortune 500 and 85 percent of the Fortune 1000 automotive companies.⁷

3

Digital wallet and payment experiences

Enable innovative digital payment products, capabilities, and platforms, e.g., e-wallets, virtual cards, and cross-border payments

Key offerings

- Mobile wallet stress testing
- E-wallet strategy
- Platform design
- Payment tokenization
- Alternative digital payments solutions
- Payments digital/agile transformation

Our mobile financial services and payments

Deloitte's "Mobile Financial Services and Payments" offering consists of end-to-end capabilities that very few can offer. Deloitte has mapped the market demand to our capabilities and drafted a set of propositions as listed below:

Mobile Financial Services (MFS) Integrated Market Strategy

MFS Operating Model and Organizational Design

MFS Channel Integration, Product, and Customer Experience Design

MFS Infrastructure and Technology Integration

MFS Risk Management and Security Plan

Deloitte has the full life cycle experience and mobile payments and processing capabilities. We also have one of the most fully integrated global teams of mobile practitioners across more than 15 countries. The organization, through its network of member firms, has an internal global collaboration call bringing practitioners from these countries together, allowing them to share ideas and collaborate on client issues. These collaboration calls also support various client projects by sharing best practices from a number of countries across the globe.

Deloitte has a myriad of white papers and articles on mobile payments underway. White papers, such as "Cell me the money" have been widely acclaimed and been used by a number of organizations across the globe to understand the mobile payments landscape.

Default payments: The digital marketplace reset you did not see coming!

There is a new trend in the consumer payments space that **will likely/could impact payment providers' position in the marketplace as customer spend shifts increasingly to all forms of digital, from e-commerce to m-commerce to in-app payments.**

This is the increasing behavior of consumers storing card and bank account payment details to make payments for future transactions. We call this "default payments." If you have stored your credit card on a ride-sharing app, or linked your bank account to pay for utilities, or tapped your smartphone at a point-of-sale (POS) terminal to pay with a card stored on a mobile wallet, then you are a default payment user!

Default payments bring new challenges for incumbents, changing the dynamics of customer acquisition and retention as payment decisions become less proactive. Not every card that a consumer owns is used for default payments. Respondents in our survey (described next) had an average of three credit cards, of which only 1.5 were used for default payments on websites.

The Deloitte Center for Financial Services' *Default Payments* study⁸ is a first-of-its-kind, incorporating a mobile diary that tracked 31,000 payment transactions over a month, augmented with a 3,000-respondent survey. With the rich results from these two primary research tools, we answer five questions: **Why** do consumers choose a default payment option? **Where** do they use them? **When** do they use them? **Which** types of payment vehicles do participants feel most comfortable storing as default payment choices? And finally, **who** uses default payment choices and **who** does not?

Our study reveals that as a percentage of digital transactions, default payments were a staggering 82 percent by number and 88 percent by value! They made up 74 percent of websites' payment traffic and 87 percent of digital apps. Of all transactions made for e-commerce retail items, 85 percent were default, and this figure was 81 percent for financial services.

In our view, it is not a question of whether default payments will alter the fortunes of payment providers in the future, but of how soon. The acceleration of digital commerce and the merging of the physical world with the digital world will all but ensure that default payments will become the norm in the very near future.

One outcome of the default payment trend is likely to be increased competition among card issuers to become the default payment option. Now is an opportune time for card issuers, payment providers, and retailers to think of strategies to take advantage of the default payment behavior, and become the "top-of-wallet" choice.

4

Modernized and faster payments platforms

Update existing payments infrastructure and implement real-time payment clearing and settlement to transform platforms

Key offerings

- Advise on platform strategy
- End-to-end payments hubs
- Reference architecture and standards
- Payments data standardization
- Faster payments readiness and education
- Vendor consolidation and selection
- Operate modernized payments platforms and functions
- Core platform assessment, selection, configuration, & implementation

Implementing enterprise payments hubs

In the current regulatory environment, many of our financial services clients are experiencing margin pressures related to their payments functions. The existing silos-based payments systems result in high cost of operations due to duplication of functionalities and services across different payments instruments and products. In this scenario, our clients are looking to leverage significant cost benefits by consolidating these diverse systems.

The enterprise payments hub is a demonstrated solution to alleviate these duplications and cost pressure challenges. It consists of a centralized infrastructure capable of processing multiple payment instruments, providing efficiency, flexibility, and a single customer view. The solution removes duplicate payment processing functions using a central set of services for channel interface management, transaction processing, transaction support, and customer life cycle management.

Deloitte's payments hub implementation methodology introduces a highly flexible, services-based approach for consolidation and incrementally developing payments hubs. In a recent application of the payments hub implementation methodology, Deloitte helped the client to develop a detailed technical architecture and road map for implementing a large, global, multicurrency B2B payments hub supporting card, automated clearing house (ACH), wire, and check-based payments. A phase-based implementation road map resulted in revenue generation events virtually every six months.

Moving to real-time

The mass movement toward real-time payment systems around the globe has contributed to an environment in which consumers, merchants, and financial institutions expect to be able to pay friends and customers, settle bills, and transfer money at the drop of a hat. While the concept of "paying now" is not a new one—cash is an immediate payment transaction instrument after all—the growth of real-time payment options has helped build a new standard among consumers and in the market. This new standard is driving change for traditional payment types—checks, credit, debit, prepaid, and the like—as consumers have generally come to expect faster settlement periods, notifications, and consolidated reporting.

Additionally, the growing ubiquity of smart devices and booming online retail commerce is driving the rapid adoption of real-time payments globally. Increasingly, consumers may be turning to their smartphones when they need to pay merchants, billers, peers, and others.

In the United States, many leading banks are already planning and implementing faster payments use cases. As part of this, many are also looking at realigning their offerings and structure to enhance adoption by the industry and customers. The US Federal Reserve is also taking an active role in driving adoption by releasing Strategies for Improving the U.S. Payments System.⁹ They have also since engaged a Faster Task Force (as well as more secure) to make faster payment solutions available to every consumer and business by 2020.

How do real-time payments work?

Most existing real-time payment systems offer an instant, 24/7, interbank electronic fund transfer service that can be initiated through one of many channels: smart phones, tablets, digital wallets, and the Web. In such a scheme, a low value real-time payment request is initiated that enables an interbank account-to-account payment fund transfer and secure transaction posting with immediate notification features.

So, what's next?

Real-time payments are likely to significantly impact the way we transact and conduct business. Real-time payments can benefit merchants, consumers, financial institutions, and society by offering enhanced visibility into payments, enabling better cash management, and helping businesses better manage day-to-day operations by improving liquidity. The liquidity improvement could be especially impactful to small merchants who may be used to waiting days for their settlement, possibly creating a positive impact on their cash flow. Further, consumers could enjoy the convenience of paying their bills at the last minute without penalties and financial institutions could provide better services. Economies around the globe could be more fluid than ever before.

While challenges remain to reaching this utopian future state, we predict that real-time payments will likely generate new consumer behaviors and spending patterns, thus increasing revenue for the payment players who are well-positioned to capitalize on this evolution.

For more information please access:
<http://www2.deloitte.com/us/en/pages/consulting/articles/real-time-payments-changing-reality-of-payments.html>

Introducing our Faster Payments Sandbox

As financial institutions consider integration and implementation of a faster payments solution, they are faced with some up-front questions:

- Which **use cases** to address in the marketplace?
- How to develop a **competitive customer experience**?



- Which faster payment **ecosystem to integrate** with?
- How to integrate into the financial institution's current **core banking and payments processing environment**? What will be the **solution architecture**?
- How can we rapidly develop a **proof of concept** to socialize and gain executive buy-in?
- How to bring in expertise and knowledge in **ISO 20022, FP ecosystems, settlement processes**, etc.?
- What are the **security and fraud risks** to address?

Deloitte's Faster Payments Sandbox environment provides an accelerated pathway to implementing a faster payments solution for a financial institution. We provide the following essential tools and frameworks to help accelerate implementations:

including immediate and scheduled P2P payments, immediate invoice payment, corporate lending on transaction, hourly contractor immediate payroll requirements, and request return of funds. This includes developing proof of concepts with leading vendors to facilitate P2P and B2B faster payments.

We also provide illustrative realizations of some of the most dominant use cases around faster payments,



Reference implementation

A working prototype based on digital technologies, integrated with a leading US Faster Payment ecosystem



Reference architecture and standards

Architecture for Faster Payment solution based on ISO 20022 message standard, digital and exponential technologies based on micro-services that provide a framework for integration with a legacy core banking platforms



Defined customer experience

Intuitive customer journeys, demonstrating key UX design principles for Faster Payment solutions



Faster payments lab standards

A lab environment based on Agile practices to collaboratively develop prototypes



Fraud and risk framework

Fraud and security controls developed specifically for faster payments solutions



Faster payments talent

Experienced resources in key areas of Faster Payments: UX design, ISO-20022, US Faster Payment ecosystems, Leading Payment Hub platforms, etc.

5

Payments innovation, blockchain, and AI

Create value from payments data from traditional and innovative sources through analytics, machine learning, and blockchain technology

Key offerings

- Customer experience analytics
- Complaints analytics (consumer protection compliance)
- Fraud prevention analytics
- AML/KYC analytics
- Data and analytics strategy
- Payments data monetization
- Payments fintech
- Blockchain and cryptocurrencies
- Digital customer experience & insights
- Customer complaints management
- Digital bank and core modernization

Payments analytics—Providing insights to respond to disruption

Change driven by payments innovation is accelerating, from adoption of digital wallets and faster payments to global payments technology companies offering solutions rooted in technological advances. Payments ecosystems players who respond to change with thoughtful, agile strategies tend to retain existing market share or become a market leader in an emerging space. Our payments practice applies analytical insights from structured, unstructured, and detail data to help payments firms develop, refine, and apply strategies that respond well to disruption and innovation.

Deloitte's consumer protection center

As payments firms increase their focus on growth by providing a differentiated, digital customer experience, they can use existing investments and analytics infrastructure to accelerate the transition. Many institutions invested in complaints management technology to address regulatory requirements, including a case management system, a database to enable reporting, and text/speech analytics capabilities.

Strategic payment analytics

How can financial institutions partner with innovators to reduce impacts of disintermediation?

How do payments organizations leverage compliance investments to drive growth?

How can payments firms monetize data while avoiding privacy or perception issues?

How can rewards players tailor communications to increase relevance to consumers?

What tactics help payments ecosystem players drive adoption of faster payments?

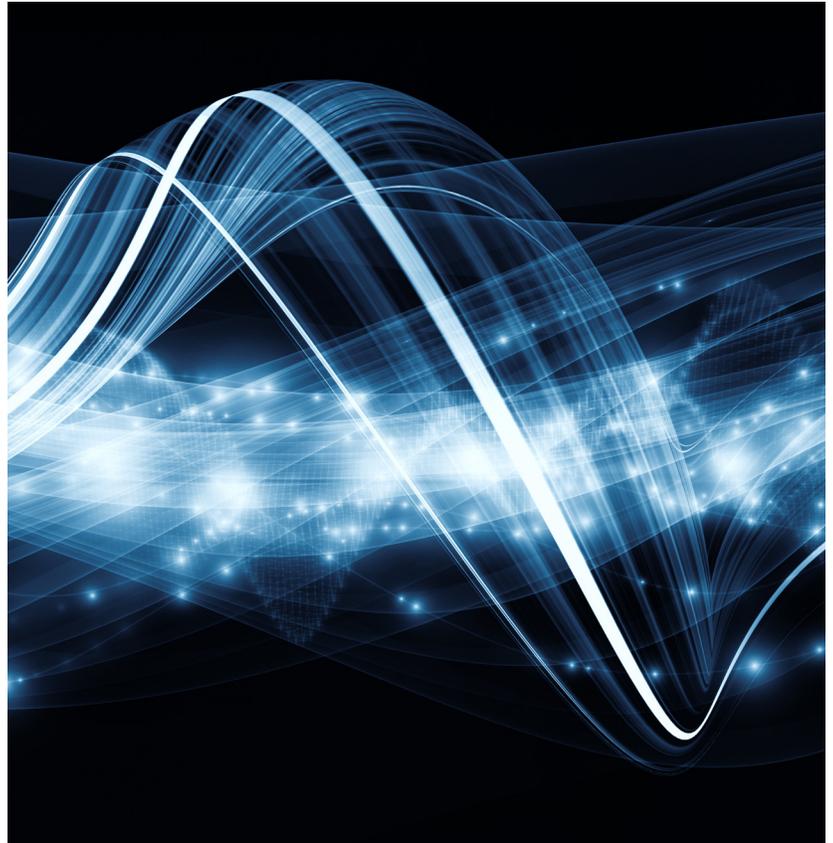
What enhancements to fraud models enable them to go from reactive to proactive?

Deloitte offers the consumer protection center (CPC) to enhance those investments by capturing, analyzing, and acting upon complaint data to support compliance, customer experience, operational risk management, and regulatory reporting. The CPC contains modules to support compliance with evolving consumer protection requirements, including:

- Mine complaint text/speech for indicators of potential noncompliance
- Deliver prescriptive reporting to support root cause analysis within the first line of defense
- Provide an early warning of an increase in complaint volume or potential risk
- Identify repeat callers and escalated complaints
- Differentiate inquiries from complaints
- Correlate increases in complaint volume with culture and conduct risk indicators

Financial institutions that have implemented the CPC have employed frameworks to drive customer experience and loyalty, thereby turning the complaints data into an asset. Several examples include:

- Applying the text/speech analytics framework to integrate previously unconnected and mine unstructured "dark data," in order to quantify the voice of customer, and identify topics that drive customer dissatisfaction, disengagement, and churn
- Identifying "moments that matter" within high complexity processes (e.g., onboarding, default management servicing, etc.), in order to trigger outbound communications that preempt complaints
- Developing sequence models to measure the impact of fraud, dispute, and holds on customer behavior
- Integrating complaints data into churn, customer lifetime value, and operational risk models
- Leveraging geospatial analytics frameworks to optimize channel distribution



Enter the blockchain—Decentralizing payments for faster, safer, and cheaper transactions

Deloitte has been applying and operationalizing strategies for implementing blockchain for its clients for years. The following infographic breaks down Deloitte's blockchain offerings on a global scale.

Deloitte blockchain offering

Deloitte provides professional services in Audit, Tax, Consulting, and Advisory across over 23 sectors within 9 industries, and our blockchain capabilities span all of them



23
Industries where we have deep business process knowledge

35+
Prototypes developed globally on various platforms

Global delivery network with 9 development teams

>800
Practitioners in our blockchain community from 40 countries



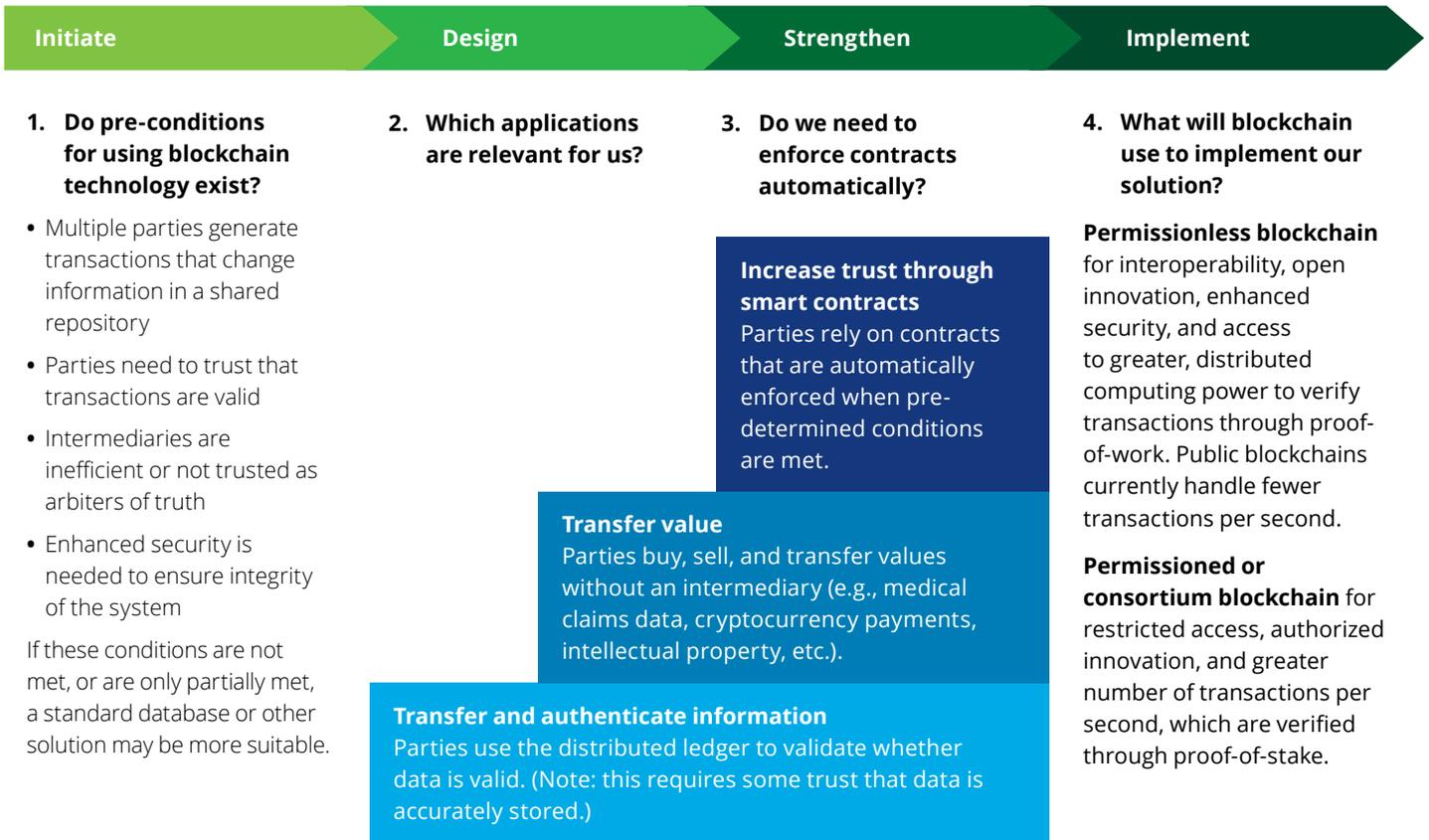
Deloitte's blockchain framework

Deloitte's blockchain framework serves as a guide for organizations interested in utilizing blockchain technology. It can help guide decision making by answering four key questions:

- When should organizations initiate blockchain pilots?
- How should they design the use cases?
- When should they strengthen the system through smart contracts?

- Should they implement permissioned, permissionless, or consortium blockchains?

For organizations new to technology, this guided four-step process simplifies a complex, rapidly evolving field into a series of discrete decisions .



Cross-border payments and blockchain

Blockchain technology stands to fundamentally disrupt cross-border payments and preliminary applications include the following key elements:

- Quick—Complete payments in near-real time
- Cheap—Reduce network costs for transactions to near zero (measured in micro-cents)
- Data Rich—Enable sharing rich transaction data and sender/receiver information for AML checks
- Frictionless—Paperless front-end; competitive rates delivered by pathfinding algorithms
- Immutable—Tamper-resistant record creates a single source of truth for reporting

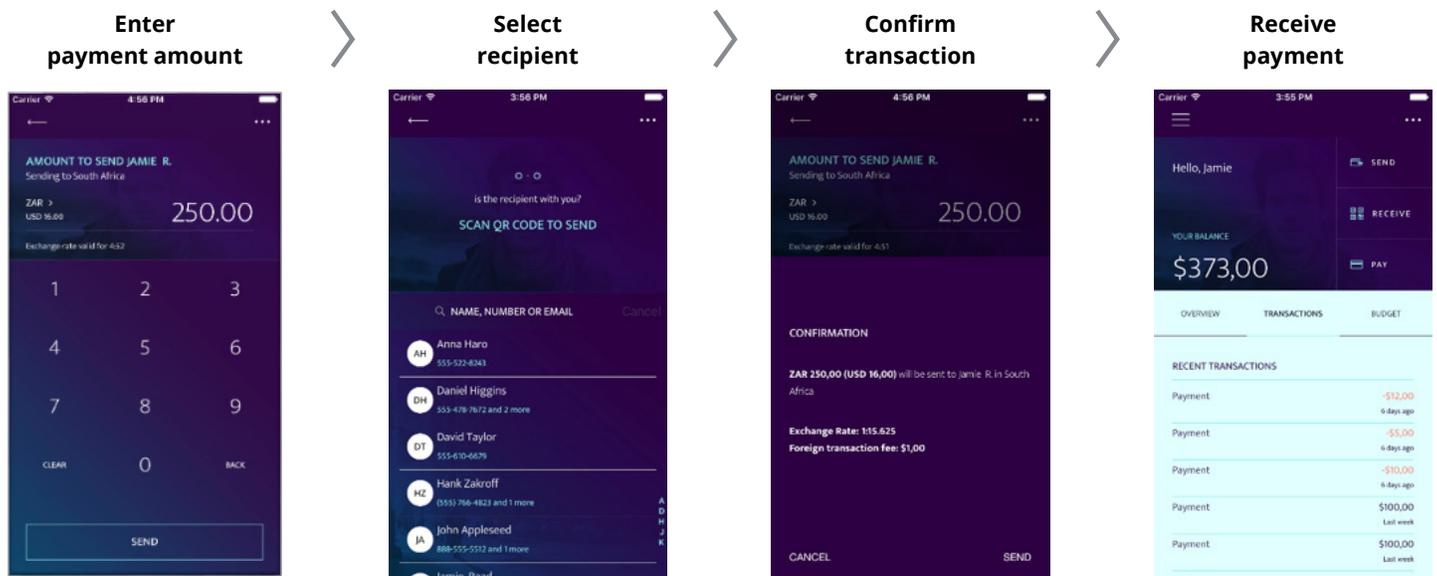
- Transparent—Provide end-to-end visibility of fund and ownership
- Secure—Protected by cryptography and multi-key authorization

Deloitte has developed a proof of concept and accelerators to facilitate cross-border payments over blockchain platforms. Applicable use cases include B2B wholesale/supplier payments and international remittances. Deloitte has collaborated with existing blockchain platforms for enhanced integration, such as Stellar and Ripple.

See below for a sample of Deloitte's cross-border prototype in action:

Customer-to-customer payment: Cross-border

Customer journey



Enablers

Federation lookup

Resolve recipient information based on recipient's unique address on blockchain network

FX rate pathfinding

Find the most optimal FX rate available on network from pre-selected providers

Information handshake

Share rich data (e.g., invoice number, terms) and sender/receiver information between transacting banks to pre-authorize transactions

Encryption/security

Secure transactions using public-private key cryptography

Distributed ledger

Reach consensus and confirm transactions on the distributed ledger

Notification and receipt

Notify recipient of incoming transaction and post payment to recipient account

Payments processing powered by blockchain

To help address the high cost of payment processing for retailers, Deloitte created a blockchain proof-of-concept to leverage the technology's inherent capabilities to remedy existing pain points. The team onboarded customers to the blockchain platform and tied their SmartID accounts to the public address of their payment cards, giving them access to a digital wallet and card funds. The prototype resulted in improved payment processing for transactions, reducing the fees and additional payment processors.

managing the approval process and sharing verified credentials of authorized users with the blockchain platform for onward account creation within the blockchain

- 2) Successful demonstration of scalable, low-latency GBP-denominated payment processing over the blockchain
- 3) In combining both identity and payment processing, the demonstration set an industry precedent for compliant, integrated solutions powered by blockchain

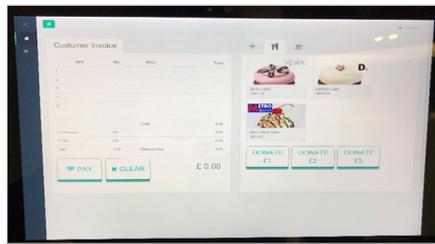
The outcomes of the proof-of-concept included:

- 1) Demonstration of the process of securely onboarding customer profiles, with Deloitte

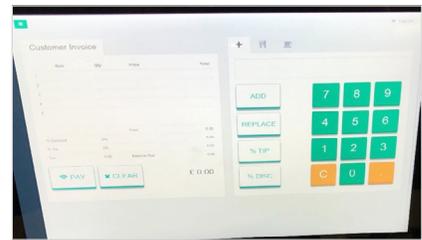
The following images outline the process of the payment processing proof-of-concept:



The mobile wallet held a real-time account of the customer's payment card. As a customer purchased goods from the 'retailers', their mobile wallet updated their card balance instantly.



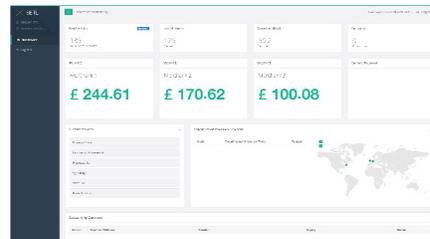
'Demo retailers' accessed a user-friendly payment dashboard. The retailer could select products for customer orders thereby creating a customer invoice on the screen.



The dashboard enabled the retailer to review and manually edit the customer order if necessary.



Once the orders were finalized, the customer tapped their contactless payment card against the reader. If sufficient funds were available, the transaction would be approved on the retailer's dashboard. Customer and retailer accounts were updated instantly.



Screens used to provide visibility of payment processing over the SETL network, enabling visibility of instant accrual to merchant accounts as payments were processed.

Natural language processing (NLP) banking— Amazon Alexa and Google Home

By 2018, 30 percent of our interactions with technology will be through voice conversations with smart machines.⁴ Companies that create integrations with voice AIs will establish themselves as the preferred supplier in their categories. As such, the Deloitte Natural Language Development Team has created a platform agnostic accelerator that supports Amazon Alexa, Google Home, and next gen NLP integrations.

Deloitte has a defined delivery approach, conversational UX design, tools, and methodologies to accelerate the development of voice applications for clients across different industries (retail, banking, wealth management, etc.).

To test the platform, the team built a joint proof-of-concept on Amazon Alexa to order groceries from home, enabled by APIs from a large partner grocery retailer.

The Deloitte NLP team has also created retail banking and wealth management use cases to better understand how people interact with banks and advisors based on how users are talking about the services.

The following are a sample of key phrases and use cases used through voice activation for financial services to provide insight into what matters most to customers:



So, what's next?

Forecasted to be the “make or break” year for blockchain technology, 2017 has seen a significant enhancement in the level of innovation for impactful blockchain use cases across industries. Tying exponential technologies together, such as IoT and blockchain technology, further

compounds the value that businesses may harness to achieve faster, cheaper, safer, and more reliable transactions. In addition to enhanced analytics, the highlighted use cases above display a common theme of know-your-customer (KYC), which shines as an emerging area of interest for companies to best differentiate themselves within the market.

6

Loyalty, rewards, and trade promotion

Create value from payments data from traditional and innovative sources through analytics, machine learning, and blockchain technology

Key offerings

- Digital customer experience and insights
- Customer engagement strategy
- Loyalty & rewards program redesign
- Customer data protection
- Mobile strategy
- Trade promotion

Spotlight on SNAP Marketing

Deloitte developed a prototype for consumers and merchants to design and bid on their own highly relevant, dynamic affinity programs enabled by social networking. We refer to this as Social Network Affinity Programs (SNAP) Marketing.

SNAP Marketing is a way to use social networking sites and data, together with untapped consumer affinities, to expand and evolve card portfolios. It can potentially drive increased card member spend and new accounts by taking advantage of special interest groups, allowing consumers to create their own affinity programs.

Simultaneously, it offers a way for merchants to compete for customers, further driving incremental spend through customized rewards to targeted consumers.

Developing the next generation of loyalty platforms

Current loyalty programs are typically inflexible, leaving stakeholders frustrated and seeking ways to optimize their relationships. Emerging mobile and customer analytics capabilities present an opportunity to redefine the loyalty rewards experience. Deloitte has combined its payments practice's product innovation and technology development capabilities to design a groundbreaking new rewards redemption platform. This platform utilizes predictive models to deliver targeted merchant offers through an innovative, social network-linked mobile application.

Deloitte's rewards redemption platform benefits loyalty program stakeholders by enhancing the customer reward redemption experience:

- **Consumers:** Analytics provide targeted, relevant offers that address consumers' actual wishes and needs.
- **Merchants:** Targeted offers allow merchants to allocate marketing spend and enhance repeat purchases.
- **Reward issuers:** Enhanced customer experience and improved point utility supports card loyalty and increases rewards points turnover.

7

Financial advisory for payments

Address various risk and compliance issues across the payments value chain

Key offerings

- Payments cyber risk
- Third-party risk for payment vendors
- Payments regulatory & noncompliance risk
- Payments fraud risk
- Payments business risk

Can risk and compliance coexist with innovation in mobile payments?

Innovation in mobile payments takes many forms. At the local grocery store, “app-heads” try to create ways to eliminate the register all together. Car manufacturers dream of ways to link service and car owners’ bank accounts. Health care providers consider ways to store records in the cloud so customers can access their records through their handheld devices. Toll payment systems noodle with how to make the payment of the toll easier and less reliant on the plastic pass in a driver’s windshield.

Yet, while innovators think about ways to enhance existing or create new products and services, consumers remain wary and worry about their personal data being compromised. And regulators charged with protecting consumers continue to develop and refine rules and regulations that aim to protect an individual’s personal and financial information.

Faced with the dilemma of complying with consumer protection regulations and mitigating risk throughout the payments life cycle, it may seem as though risk management and innovation in the mobile payments world are doomed to be mutually exclusive.

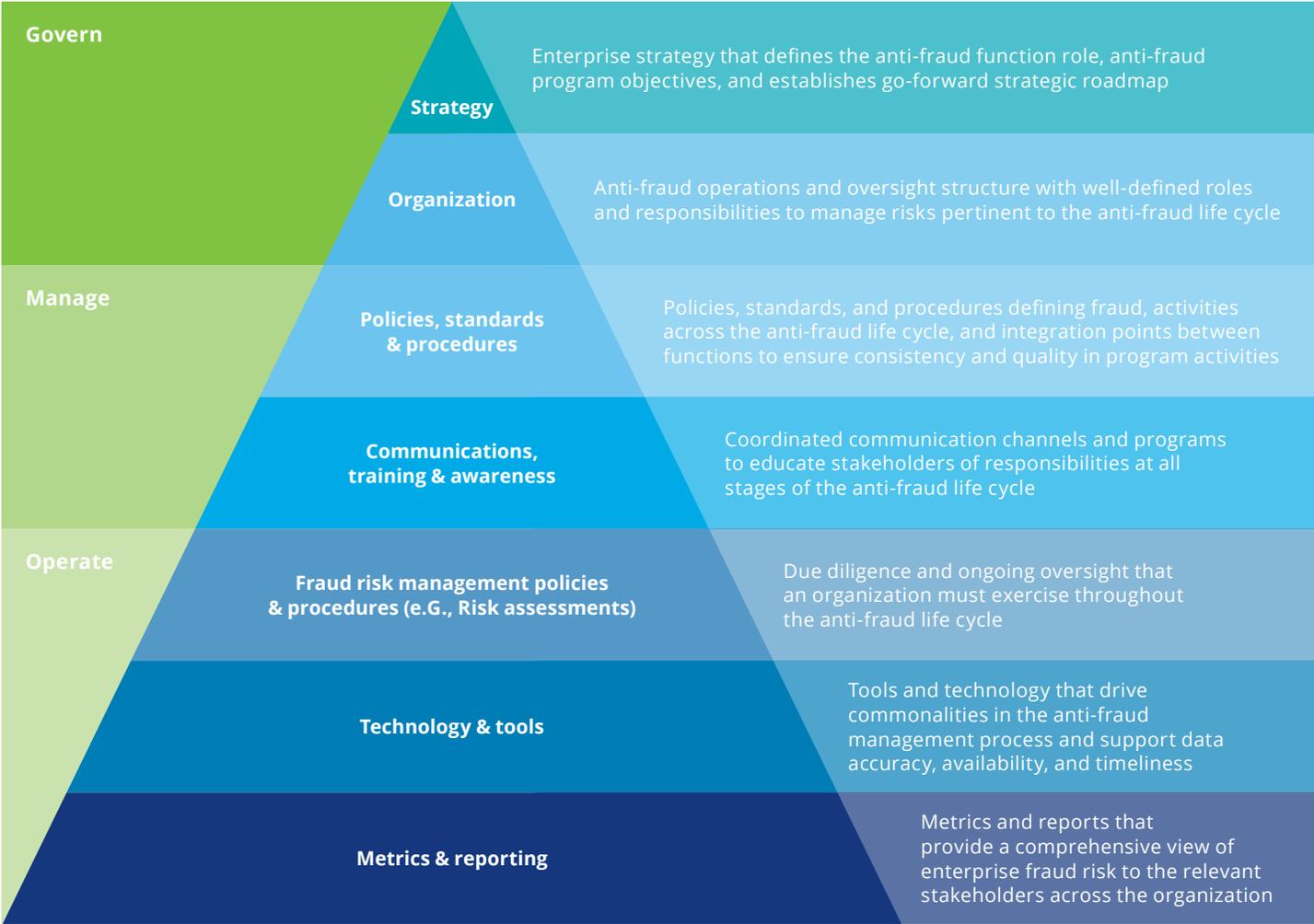
Not so. Innovation forged in conjunction with risk management may result in a symbiotic relationship that could produce innovative products and services that benefit from the application of a compliance and risk lens. Involving the “watchdogs” in compliance and risk in the innovation process may eliminate having to fix products on the fly after they’ve been launched.

Coupling the actions of developers and innovators with compliance and risk executives could prove a competitive advantage. Working together, they could enhance new products with controls that could help mitigate risk. Their common goal could focus not only on creating the “killer app” but also could aim to avoid compliance and risk pitfalls—before the first consumer’s finger touches the download button on the screen of a handheld device. Such a new mobile payment app could provide consumers with confidence in the end product and, most importantly, the safety of their data from the get-go.

Risk and compliance in mobile payments innovation should not be an afterthought; rather they should become part of the innovation process. Watchdogs and innovators are the new yin and yang of the mobile payments industry.

Payments risk management framework

Deloitte's risk management framework for payments includes an assessment across people, process, and infrastructure and provides the ability to evaluate risks across the lines of businesses and the second line of defense.



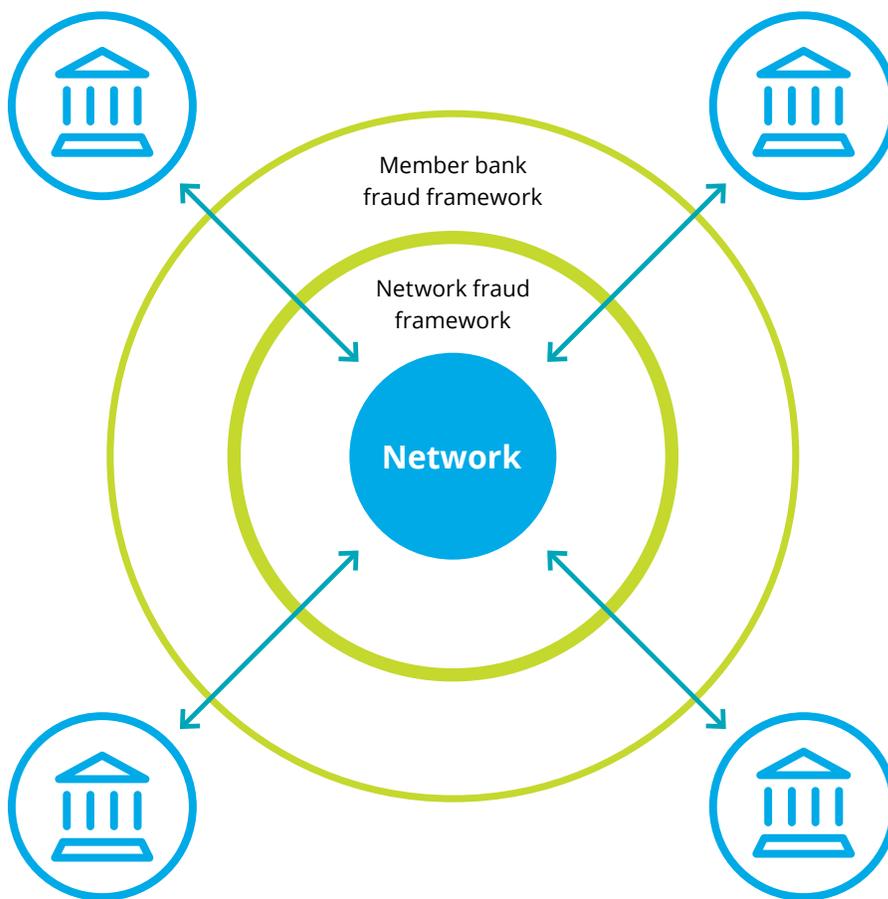
Funds transfer fraud mitigation across a network

With the growing threat to funds transfer networks, we believe an integrated cyber/fraud risk framework is required to mitigate sophisticated attacks. This framework, combined with authentication strategies

that include behavioral biometrics and stepped-up authentication via OTPs or enrollment biometrics, could potentially reduce the risks facing an organization.

Fraud mitigation requires two lines of defense: bank-level and network-level fraud framework.

Fraud mitigation framework



Network fraud framework

- Standardized security governance, rules, procedures, and fraud services for member banks
- Third-party vendor risk requirements
- Sharing of fraud data and incidents
- Real-time predictive risk scoring of transactions
- Use of distributed ledger technologies and multi-signature keys for transaction origination and processing

Bank fraud framework

- Integrated fraud and cyber risk framework—people, process, and technology
 - Governance and operating model
 - Policies and standards
 - Processes and technology
 - Risk reporting and escalation processes
 - Risk awareness and training
- Sample controls—front and back office
 - Customer authentication
 - Device fingerprinting
 - Out-of-bound communication of OTP
 - Call backs
 - Disposable email addresses (DEAs) monitoring
 - Maker/checker segregation of duties
 - Profile changes
- Analytics to detect suspicious activity
 - Behavioral trend analytics: originator, transaction, and beneficiary
 - Session analytics
 - Social network analytics
 - Negative IP match
 - Mule account number match
 - Behavioral analytics to monitor anomalous activity, such as activity outside office hours, transfer limit settings, and changes to access privileges
 - Detection of template modification of automated wires; unexpected relationship between beneficiary and originator
 - Plan to scrutinize wires more stringently when a potential DDOS attack is detected

- Secure
 - Network and workstations used to initiate payments
 - Use of two-factor authentication with one-time passwords for logins
 - Use of out-of-band authentication for wire transfer authorizations
- Vigilant
 - Implement malware detection
 - Implement host-based IDPS (Intrusion Detection and Prevention Systems)
 - Machine learning-based anomaly detection of network activity and applications; email analytics on header data, links, and attachments
 - Real-time monitoring of maker, checker, and admin accounts
- Resilient
 - Incident response plan
 - Mock scenario testing
 - Forensics process and services
 - Crisis management procedures

Blockchain risk management

Risk practitioners across sectors are very excited about blockchain's promise to help organizations minimize and, in some cases, eliminate the risks posed by current systems. Blockchain is being viewed as the foundational technology for the future of risk management. However, as the technology continues to mature and many theoretical use cases begin to get ready for commercialization, it behooves the industry to start

focusing on a less discussed question: "Do blockchain-based business models expose the firm and market to new types of risk? If so, what should firms do to mitigate these risks?" It's critical for firms to understand that while blockchain promises to drive efficiency in business processes and mitigate certain existing risks, it poses new risks to the firm and market. Additionally, it's important to understand the evolution of regulatory guidance and its implications.



Earlier this year, the Financial Industry Regulatory Authority (FINRA) issued detailed guidance on some of the operational and regulatory considerations for developing various use cases within capital markets. Firms need to ensure that these regulatory requirements are addressed in the blockchain-based business models.

Blockchains fall under two types: permissionless and permissioned chains. Permissionless blockchains allow any party without any vetting to participate in the network, while permissioned blockchains are formed by consortiums or an administrator who evaluate the participation of an entity on the blockchain framework.

Permissionless blockchains start out with a pool of cryptocurrency to pay service providers, or miners, to participate in the process. Miners are service providers who update the general ledger with transactions that occurred between participants. Anyone can participate as a miner if they meet certain technological requirements dictated by the network. No other entity checks, such as know your customer (KYC) or other background checks of the service provider, are possible in this framework. Anyone acquiring this cryptocurrency on the blockchain framework can transact with any entity on the blockchain. As such, there is increased risk of money laundering and theft of currency from a user's blockchain account on that network. Additionally, permissionless blockchains have scalability and privacy issues that pose a significant risk to the use of this framework by financial institutions.

Permissioned blockchains do not have the cryptocurrency requirement as the consortium network or the administrator can predefine the update process without the use of unvetted service providers. Usually, this involves a choice of a consensus algorithm that is deployed on the network to update the blockchain ledger. Additionally, scalability and privacy issues can be handled by the choice of infrastructure by the participants, and suspicious activity monitoring can be deployed across the network by the administrator or the consortium. Therefore, this framework is more suitable for institutions to use with a group of known and predetermined peers.

Regardless of the type of blockchain, the business logic is encoded using smart contracts. Smart contracts are self-executing codes on the blockchain framework that enable straight-through processing, which means that manual intervention is not required to execute transactions. Smart contracts rely on data from outside entities referred to as "oracles," and can act on data associated with any public address or with another smart contract on the blockchain. A smart contract can mimic a contract and can execute the contract automatically if conditions required to consummate the contract have been met. Smart contracts are generally the most vulnerable points for cyberattack and technology failures. Like any other software code, smart contracts require robust testing and adequate controls to mitigate potential risks to blockchain-based business processes.

Firms across different industries are investing heavily in this new technology to build a variety of use cases on topics such as identity management, provenance, trade finance, clearing and settlement, cross-border payment, etc. While the blockchain technology promises to drive efficiency or reduce cost in each of the use cases, the blockchain, as well as the smart contracts encoding the business logic, have certain inherent risks. It's imperative that firms understand the risks and the appropriate safeguards to reap the benefits of this technology. Failure to mitigate the risks posed by adopting the new technology might undermine all the benefits. These risks can be broadly classified under three categories: standard risks, value transfer risks, and smart contract risks.

An effective blockchain risk management framework

The blockchain peer-to-peer framework offers the potential to transform current business processes by disintermediating central entities or processes, improving efficiencies, and creating an immutable audit trail of transactions. This provides the opportunity to lower costs, decrease interaction or settlement times, and improve transparency for all parties. This transformational framework could alter the way financial institutions conduct business as many transactions are peer-to-peer in nature.

While the benefits are clear, there are myriad risks that may be imposed by this nascent technology.

Understanding of the blockchain technology and its associated risks articulated in this paper may change and evolve as this technology continues to mature. It's therefore imperative for all organizations to continue to monitor the development of this technology and its application to various use cases.

Blockchain technology will transform business models from a human-based trust model to an algorithm-based trust model, which might expose firms to risks that they have not encountered before. In order to respond to such risks, firms should consider establishing a robust risk management strategy, governance, and controls framework.

Risk management framework											
Business objectives	Growth / innovation		Client experience		Cost reduction		Improved time to market		Risk and compliance management		
	Information technology		Human resources		Compliance		Finance		Other		
Core processes, supporting functions	Standard risk considerations				Value transfer risk considerations			Smart contract risk considerations			
	Strategic	Reputational	Business continuity	Security	Consensus protocol		Data confidentiality		Business and regulatory	Legal liability	
	Regulatory	Ops and IT	Contractual	Supplier	Key management		Liquidity		Enforcement of contract	Governance	
Risk considerations	Governance and oversight		Policies and standards		Management processes		Tools and technology		Risk metrics and reporting		Risk culture
Operating model components	Governance and oversight		Policies and standards		Management processes		Tools and technology		Risk metrics and reporting		Risk culture

8

Tax for payments

Address various tax issues across the payments value chain

Key offerings

- Transfer pricing
- Cryptocurrency tax
- International tax
- Credits & incentives
- Multistate—Income/franchise, sales, and use tax

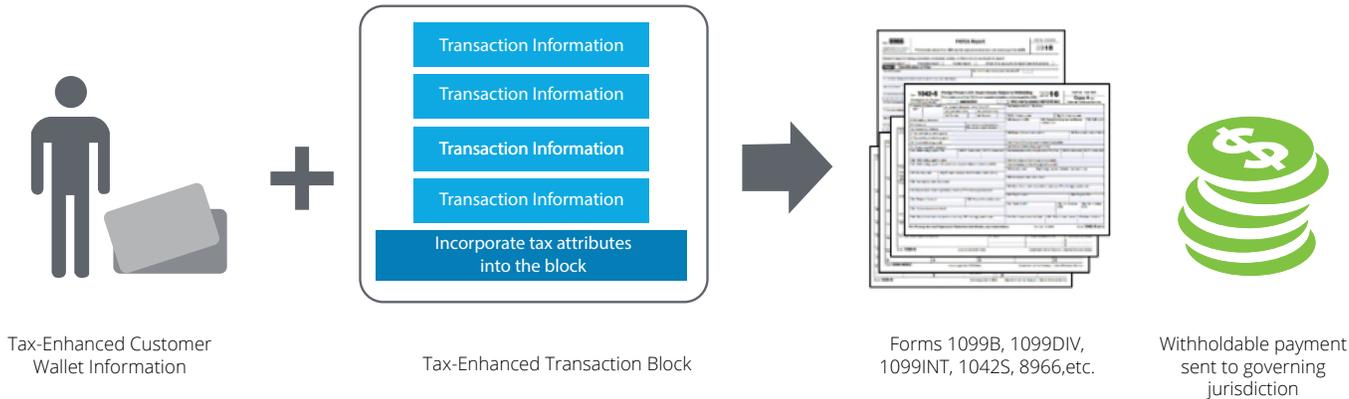
Don't forget your cryptocurrency taxes

Cryptocurrency tax considerations

There are various tax implications that need to be taken into consideration when it comes to cryptocurrency, including:

- Revenue recognition—Barter transactions, mining activity, service contracts, hedging, market makers, and mark to market
- Compensation—Options and salaries payable in cryptocurrency
- International reporting—Form 1099, basis tracking, and FBAR
- Other—Character (capital vs. ordinary gain/loss), state apportionment, sales, and VAT considerations, cross-border transactions (withholding requirements), tax accounting methods to determine basis-specific ID versus FIFO, and section 83 considerations

Working with fintech to develop a tax enhanced blockchain



The enhanced customer wallet along with the enhanced block can generate the necessary tax forms by aggregating the customers' wallets and the tax attributes held within the blocks.

1 The enhanced customer wallet contains all of the customer tax demographic information and avoids the need for a separate customer database

2 The enhanced block will hold transaction information and tax attributes for the transaction

3 By including the tax attributes within blockchain, automatic generation of the necessary tax reports and submission of the withholdable payments can be enabled as the underlying transaction occurs

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Working with fintech to develop a tax enhanced blockchain

Audit for payments

Provide audit services across the payments value chain

Key offerings

- Financial statement audits
- Internal Control over Financial Reporting (ICFR) audits
- Financial statement compilations
- Agreed upon procedures
- New accounting standard implementation
- Consultation on technical industry accounting matters
- SOX readiness assessments
- Control deficiency remediation

Deloitte—Auditor of the future

Today's business leaders deserve an auditor who has a deep understanding of their business and industry—one who can deliver higher quality and less resource-intensive audits that provide greater insight and drive more business value. This is where Deloitte excels, and we are delivering the audit of the future—today. Deloitte leads the Big Four audit and accounting firms in the auditing of payment processors (as defined by JPMorgan Data Processing Outlook, 2016), by nearly twice as many as the next closest competitor.

Our multidisciplinary approach and full complement of business capabilities within the payments industry—including audit, enterprise risk, tax, and consulting services—enhance the quality of our audits through knowledge sharing and the broad lens of perspective and resources we can bring to address your business challenges. We also often provide advisory services, frequently including M&A, for many of our audit clients. Because the unique business and related financial reporting risks within the payments industry drive our approach to the audit, we:

- Assess risk based on the structure and operations of your organization
- Develop a refined view of risk that pinpoints what could go wrong to cause a material misstatement in the underlying account balances and disclosures for the financial statements of each reporting entity
- Customize the nature, timing, and extent of the control and substantive procedures we perform by matching the level of risk identified for each significant account, class of transaction, and disclosure with the relevant assertions

At Deloitte, audit innovation enables our auditors to provide greater insight into your financial risks, internal control risks, and strategic challenges. Deloitte is a leader in audit innovation⁵, and our robust tools and technologies allow us to effectively and efficiently support the audit and respond to your unique and complex environment. We have successfully leveraged new technologies, using big data analytics, and improving the audit delivery process in response to the needs of our payments clients and the ever-changing environment in which we operate. Specific examples include:

Actual application	Potential benefit to our clients
<p>Visualize revenue transactions recorded during the year and identify any transactions that signify an anomaly or additional risk</p>	<p>A risk-based audit approach focusing more audit effort on revenue transactions with unusual characteristics</p> <p>A more meaningful discussion with management regarding revenue trends and anomalies</p>
<p>Obtain data extract of volume by day and recomputed volume by category that was important to apply by fee category</p>	<p>Auditing large part of the population rather than individual transactions</p> <p>Can eliminate the need to perform detailed selections of a large volume of individual transactions</p>
<p>For an entire loan portfolio:</p> <ul style="list-style-type: none"> • Visualize multiple segments by location across the United States (e.g., average balance, FICO score) to identify concentrations of risk • Visualize average delinquencies and number of accounts by FICO score • Create maturation of losses by vintage 	<p>More robust risk assessment in order to pinpoint significant risk more thoroughly and reduce substantive testing for certain aspects or assertions of the account balance</p> <p>Can eliminate the need to perform detailed selections of charge-offs by year originated</p>
<p>Use our Argus tool, which is an audit application that leverages advanced machine learning techniques to easily process, highlight, and extract key information from documents to:</p> <ul style="list-style-type: none"> • Extract key contract terms applicable to determine appropriate revenue recognition policy (including analysis of Accounting Standard Codification ["ASC"] 606: <i>Revenue from Contracts with Customers</i>) • Compare customer or merchant agreements to standardized agreements to identify customized terms impacting revenue recognition • Assist with our evaluation of service organization controls ("SOC") 1 reports received for SOX-relevant outsourced service providers • Compare the user entity controls ("UEC") between the SOC 1 reports received for 2016 and the SOC 1 reports received during our 2015 audit of the company • Quickly evaluate any changes in UECs as well as any general changes to the SOC 1 reports year-over-year 	<p>Ability to complete work in a shorter timeframe and earlier visibility to follow-up questions</p>

Actual application	Potential benefit to our clients
<p>Deloitte Cortex enables the seamless extraction and transfer of data from a client's enterprise resource planning (ERP) system and other applications. Cortex's data extraction solution uses leading-edge extraction technology, paired with our proprietary workflow.</p>	<p>Obtain data more efficiently from client's ERPs and other systems in a consistent, repeatable format that requires minimal client effort</p>
<p>Use Deloitte Optix to analytically review journal entry populations in real time. This next-generation application applies analytical techniques to our clients' data sets to identify transactions with characteristics of audit interest.</p>	<p>Identify deeper insights and analysis of existing data—and perform high quality audits</p>
<p>Use Deloitte Signal (a risk assessment tool) to examine a wide range of financial data which is used to predict potential risks using trend and regression analysis. This enhanced risk assessment assists teams to identify potential fraud and other risk factors.</p>	<p>A risk-based audit approach focusing more audit effort on revenue transactions with unusual characteristics</p> <p>Explore the results with peer benchmarking to develop insights, and can bring the data to life with visualization dashboards</p>
<p>A disclosure analytics tool that offers breakthrough capabilities, including:</p> <ul style="list-style-type: none"> • A single online repository for footnote disclosures, accounting policies, and SEC comment letters • Text analytics help determine the relative complexity of a disclosure or policy at a glance • Exportable reports in PDF and Word format for sharing insights with clients 	<p>Researching footnote disclosures, accounting policies, and SEC comment letters and comparing them across companies quickly and easily</p>

Our commitment to audit innovation has been recognized with Deloitte being a finalist in 2016 and winning the 2015 Audit Innovation of the Year award from the International Accounting Bulletin. Deloitte was also recognized through winning the British Accountancy Awards for "Most Innovative Large Practice."

With the deep industry experience in our payments practice, we assist various companies implement complex and new technical accounting standards such

as ASC606: Revenue from contracts with customers; the new standard for accounting for leases (ASU 2016-02); and the credit impairment standard (current expected credit losses [CECL] model).

We believe an audit is more than an obligation for our clients; it's an opportunity to see further and deeper into their business. We strongly believe executing a fresh service delivery and innovative approach is a true differentiator for Deloitte.

Our success stories

We have extensive capabilities and experience assisting issuers, processors, associations, and networks in their efforts to address a broad range of business transformation and operational excellence challenges.

	Strategy	Operations	Technology	Financial Advisory	Tax & Accounting
Payments strategy and organizational design	<p>Payments strategy at a global hotel and leisure company: Developed a comprehensive global payments strategy that enabled customer growth, increased spend across payment channels, improved revenue recovery from fraudulent bookings, strengthened payment security, and reduced operational overhead for property owners. The payments business case demonstrated a \$130M+ net benefit over five years, transforming payments from a cost center into a revenue driver for the client.</p>	✓			
	<p>Market assessment for a major online payments platform: Provided market-specific recommendations that helped the client identify key action items for each market (i.e., collaborating with local networks, enabling prepaid, e-wallets with significant usage) to help maximize market share uplift. Based on Deloitte's assessment, the client initiated RFPs for payment vendors across target countries leveraging capability assessment maps to refine potential partnership options.</p>	✓	✓		
	<p>Payments strategy and implementation for an India-based telecom player: Deployed a 40+ member integrated team of consultants from the US, UK, and India firms across strategy, operations, technology, and human capital/talent paired up with an India-based global delivery center. Developed a holistic strategy to address needs of all key stakeholders in the ecosystem including consumers, merchants, agents, the government, and banks. Led selection and integration of 20+ vendor platforms to provide a complete digital payments solution for customers. Completed implementation from strategy through pilot in eight months. Set up a payments business that will revolutionize payments in India with a goal of digitizing 500M+ transactions in the first year of commercial operations.</p>	✓	✓	✓	

		Strategy	Operations	Technology	Financial Advisory	Tax & Accounting
Payments strategy and organizational design	Merchant acquiring business strategy development for a global bank: Evaluated the future business model of the merchant acquiring business of the bank to provide a view on 1) target merchants, 2) merchant needs and pain points of different merchant segments, and 3) new business model in consideration of competitive advantage and cost advantage of the merchant acquiring business.	✓				
B2B, vertical, and cross-industry growth	B2B product strategy at a major credit card company: Aligned card network's B2B product offerings with prioritized commodities and identified potential value propositions across target markets. Developed go-forward action plans and use cases to highlight potential significance and applicability of insights and recommendations in real-life scenarios.	✓				
	Cross-border B2B payments at a global corporate payments company: Identified the relative attractiveness of the cross-border B2B payments opportunity across the six target markets, enabling the card network to prioritize and build a focused strategy. Recommended potential additions and refinements to the card network's value proposition across target markets.	✓				
	Mobile payments strategy for a multinational automotive company: Developed a global payments strategy and identified key capabilities required to monetize and operationalize a mobile app in China and Europe. Recommended a sustainable business model along with over 20 payments monetization opportunities and supporting considerations related to risk, regulatory, tax, and accounting.	✓	✓		✓	✓

		Strategy	Operations	Technology	Financial Advisory	Tax & Accounting
Digital wallets and payment experiences	<p>Mobile wallet at a travel and leisure company: As part of a mobile wallet launch, identified current documentation and potential gaps; developed new documentation for business rules, data sources, and reporting requirements; and designed and documented 27 new processes. Coordinated with system vendors to resolve Day 1 launch issues and supported the clarification of deliverables post launch.</p>		✓	✓		
	<p>mPos conceptualization and implementation for a global sports equipment and apparel retailer: Designed, delivered, and implemented national, in-store mPOS pilot application unifying the customer experience, improving retail growth, and enhancing customer service. Deloitte Digital conceptualized and implemented the best-in-class solution in under three months, laying the groundwork for enhanced cross-channel inventory tracking, consumer insights, and sales-force optimization.</p>	✓	✓	✓		

		Strategy	Operations	Technology	Financial Advisory	Tax & Accounting
Modernized and faster payments	<p>EMV migration at a top 50 regional bank: Leveraged international payments practice to bring EMV expertise from countries that had undergone EMV migration already, helping to future proof the client's EMV strategy against possible scenarios that could play out post liability shift. Built a card deployment strategy that remained flexible to allow for uncertainties in merchant acceptance and vendor supply, targeted high-value, high-risk, and regularly traveling customers first.</p>	✓		✓		
	<p>Core payments redesign and re-platforming at a large global payments processor: Set up and led a program that focused on improving operations and underlying technology and infrastructure to process payments of all major instrument types with a particular focus on credit card payments. Defined end-state business architecture and production ramp strategy and led E2E quality assurance testing. Program successfully improved the availability and system uptime to 99.99 percent and reduced end-to-end payment processing latency to less than two seconds.</p>	✓	✓	✓		
	<p>Healthcare advantage modernization for a major US regional bank: Mapped 2015 priorities against a repeatable business value/urgency framework and created the "order board" of priorities across teams. Designed and deployed metric dashboards to advise leadership on product and platform performance.</p>		✓	✓		
	<p>Consumer and merchant credit expansion for a large payments player: Positioned client to compete in the global consumer credit market by building a flexible credit platform that can be rapidly and efficiently scaled to new markets. Enabled over \$100M worth of credit purchases by almost 50,000 customers within one year of launch in the US. Simultaneously launched in the UK, where it scaled to \$60M in purchases by a similar number of users in the same timeframe. Established and owned a comprehensive quality management organization focused on customer experiences end to end across the full portfolio, which was then leveraged by the client in multiple future large-scale programs.</p>		✓	✓		

		Strategy	Operations	Technology	Financial Advisory	Tax & Accounting
Payments innovation, blockchain, and AI	Blockchain loyalty at a global lodging company: Established burning platform for exploring blockchain applications and articulated how the blockchain would create value for the client, hotel owners, and guests. Created blockchain impact scenarios for socialization, including high-level roadmap, pilot design principles, and a vendor list. Developed future-state vision of transformative reward liability management ecosystem.	✓	✓			
	Strategy/innovation for credit card unit at a global bank: Deloitte 1) applied a rapid user research development approach to surface new consumer insights and develop a portfolio of compelling ideas within identified next-generation areas of opportunity; 2) validated three high-potential concepts with consumers to demonstrate potential for uptake and initial price points, aiding their acceleration into the client's pipeline; and 3) provided an overall framework of solution spaces to help the client identify gaps and gauge the fit of future ideas within the context of their current portfolio.	✓				
	Enterprise-wide complaint reporting and analytics system for a universal bank: Deloitte tailored CPC modules to support the bank in building an enterprise-wide complaint reporting and analytics system which helped the bank deliver customer complaint reporting and identify root causes more efficiently. By applying the Deloitte complaints data model, we validated that the complaint capture system and warehouse included critical data elements. Based on the warehouse, we developed five enterprise dashboards for complaints tracking. To help complaint mining for potential noncompliance, we built search terms for 25+ consumer protection regulations and implemented machine learning models to reduce false positives from 95 percent to 50 percent. Therefore, the system helped the bank reduce processing time for reporting, mitigate risk within non-escalated complaints, and standardize management/committee reporting.		✓	✓		
	Data and analytics strategic transformation for global universal bank: The group COO, CIO, and CDO launched an initiative to enhance data and analytics capabilities, architecture, tools, analytics, and shared services. Deloitte helped establish a "cost-to-achieve" transformation program with five global data and analytics sub-streams which included operational analytics. Deloitte also provided the blueprints for new globally shared capabilities, such as an integrated risk-finance architecture, new integration framework, global customer master, and data management frameworks. These provided the foundation for fit-for-purpose data lakes, serving risk, finance, LOBs, customer, and AML/KYC domains, and accelerated the bank's capability to derive analytical insights from their data.		✓	✓		

		Strategy	Operations	Technology	Financial Advisory	Tax & Accounting
Loyalty, rewards, and trade promotion	<p>Transformation of credit card rewards, marketing, and communications functions for a multinational payment services provider: Deloitte 1) engaged stakeholders across functions to map out the as-is end-to-end process and controls across in-scope functions; 2) identified non-value-added activities and process bottlenecks to design to-be processes; 3) assessed control infrastructure to rationalize number of controls and identified automation opportunities; and 4) developed an implementation roadmap to roll out the new process in the short, medium, and long term. Identified over \$19M in cost savings across the in-scope functions and eliminated redundant controls and identified automation opportunities for 90 percent of controls.</p>		✓			
	<p>Diagnosing customer experience issues for a department store retailer's customer and credit services: Analyzed and uncovered very specific issues underlying the sentiment challenges and found that pain points exist across omnichannel, credit, and fraud organizational units. Focused on the top 10 key initiatives as measured by business impact and speed to benefit realization. For high-priority initiatives, roadmaps and supporting project plans were developed.</p>	✓	✓			

		Strategy	Operations	Technology	Financial Advisory	Tax & Accounting
Financial advisory for payments	<p>M&A financial due diligence and integration planning for a payments service provider: Efficiently leveraged a cross-service-area (Consulting, Advisory, Tax) and cross-border team (US, Canada, UK) to deliver complicated due diligence, synergy assessment, and integration planning efforts.</p>	✓			✓	✓
	<p>Fraud risk assessment for a global bank: Performed a fraud risk assessment for account enrollment, debit and credit card transactions, and ACH transactions (including corresponding returns and refunds). Developed prioritized recommendations for strategic enhancements across people, processes, and technology to mitigate risk.</p>				✓	
	<p>Risk assessment for global mobile financial services for a large telecom provider: Provided a comprehensive risk register of all risks in mobile financial services across Asia, Europe, and Africa including risks for various product lines at the country level and at the program level.</p>				✓	
	<p>Vendor assessment for payments engine provider: Assisted the client in selecting a replacement for its ACH and Wire application by performing deep dives on vendors' functional and technical capabilities, viability, and implementation profile to help choose the right partner.</p>				✓	
	<p>PCI compliance for a payments service provider: Performed a regulatory gap assessment for client to establish pre-paid mobile payment ecosystem, provided recommendations to achieve short-term compliance with local payment regulation and PCI-DSS v3, and designed an operating model to maintain long-term compliance.</p>				✓	
	<p>Cyber risk assessment for retail financial institution: As part of a pre-deal close, performed a deep dive IT, cyber risk, and vulnerability assessment of the client's credit card business portfolio to identify target IT vulnerabilities and control gaps and developed a risk-based remediation plan.</p>				✓	

		Strategy	Operations	Technology	Financial Advisory	Tax & Accounting
Tax for payments	<p>Tax credit and incentives for originators and marketplace platform startups: Assisted fintech companies in exploring, identifying, and securing available federal and state tax credits, both refundable and non-refundable, while they enter new markets, relocate businesses to different jurisdictions, and expand their workforce. Successfully assisted companies to avoid paying unnecessary taxes, obtain immediate refunds, improve earnings, and enhance the economic value of company initiatives.</p>					
	<p>Global information reporting for a leading worldwide online payment company: Identified gaps in system processes and developments and provided optimal solutions in capturing timely data for information reporting compliance. Provided advisory services in implementing changes to the operating model that leads to compliance, risk management, and the desired vendor experience. Provided tax examination and remediation support to reduce potential compliance exposures and penalties.</p>					
	<p>International expansion and transfer pricing for global fintech startups: Positioned clients to compete in a global online market by providing consultations relating to tax-efficient structure, choice of entity types, and utilization of losses. Provided insightful solutions and analysis for startups that look for cross-border financing alternatives and addressed such issues as withholding taxes, arm's-length interest rates, and debt versus equity considerations. Assisted companies in tax planning relating to their cross-border utilization of intellectual property and blockchain technology.</p>					

	Core business	Representative clients
Audit for payments	Payments	<ul style="list-style-type: none"> • Alliance Data Systems • Blackhawk Network • Discover Financial Services • Evertec • Evo Payments International • Global Payments • JCB International Credit Card Co., Ltd. • PayForward LLC • Vantiv • WEX Inc.
	Payroll	<ul style="list-style-type: none"> • Automated Data Processing • Trinet
	Core FSI processors	<ul style="list-style-type: none"> • Broadridge • CDK Global • Fiserv

Contact us

For further information about our payments practice and global leadership, please email us at paymentspractice@deloitte.com.

Endnotes

1. ALM Intelligence (formerly Kennedy Research & Advisory); Consulting to the Banking Sector: Cards & Payments; © 2013 ALM Media Properties, LLC.
2. Deloitte Consulting Payments team, July 2011.
3. For market share: ALM Intelligence (formerly Kennedy Research & Advisory); Consulting to the Banking Sector: Cards & Payments; © 2013 ALM Media Properties, LLC. For formalized business units: Deloitte Consulting Payments team analysis, 2017.
4. Source://www.mobilecommercedaily.com/2011/12/21/sears-is-2011-mobile-retailer-of-the-year?rr44b=no.
5. ALM Intelligence (formerly Kennedy Research & Advisory); Consulting to the Banking Sector: Cards & Payments; © 2013 ALM Media Properties, LLC.
6. B2B payments for the middle market: Addressing unmet needs to tap into a new pathway for growth <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/financial-services/us-fsi-b2b-payments-untapped-opportunity.pdf>.
7. Deloitte Automotive Practice - <https://www2.deloitte.com/us/en/pages/manufacturing/solutions/about-automotive.html>.
8. Deloitte University Press: "Default" payment methods.
9. U.S. Federal Reserve System: Strategies for Improving the U.S. Payments System.

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