Retail: Opening the Doors to Blockchain

Retailers increasingly recognize blockchain’s transformative ability to streamline operations, ensure product authenticity and enable tighter supply chain collaboration, our latest study reveals. However, most are still working to fully understand how to harness its potential inside their four walls and beyond.
EXECUTIVE SUMMARY

Blockchain technology is poised to fundamentally alter the retail industry. Yet, many retailers have not taken the steps necessary to understand how the technology can help their business and what will be required to embrace blockchain thinking and technology. Retailers should begin collaborating with external stakeholders and partners on joint projects to stress-test how and where blockchain’s distributed ledger and shared infrastructure, in combination with smart contracts, can fit into their businesses. Retailers that move aggressively will enjoy an early advantage by converting analog and labor-intensive tasks into digitally-automated processes.

To understand how retail organizations view blockchain, we conducted a global survey of 321 retail professionals on how they expect blockchain to impact their industry and the preparatory steps their organizations are taking (see Methodology, page 24).

Respondents told us that blockchain has the potential to reinvent and in some cases obviate key business functions throughout their organizations, bringing greater trust and security to how they interact and transact across the extended value chain. Blockchain’s business fit is seemingly endless, spanning supply chain management, accounting and audit, and related account management processes.

By enabling tighter collaboration, blockchain could improve supply chain visibility, which would enhance sales forecasting and inventory control while also establishing product
provenance and authenticity. Eliminating the need for redundant management systems and databases across organizations and business partners would increase operational efficiency and reduce costs. Transaction settlement would also become faster and cheaper. Blockchain’s strong built-in encryption could also improve data security and mitigate corruption.

While banks and financial services firms have worked on blockchain applications for several years, the potential of the technology to transform numerous business processes across industries is becoming increasingly apparent. Moreover, the recent raft of successful pilots in the financial services space1 should give retailers the confidence to step forward and assess not only how they can leverage blockchain technology but also the additional expertise they will need to succeed.

A first step is for retailers to educate themselves on the nature of blockchain technology and its value for retail operations. They can start by identifying the business processes for which blockchain could help streamline operations. Special attention should be paid to the supply chain, where a blockchain-enabled network can streamline the duplicative record-keeping and databases currently maintained by organizations and their suppliers and distribution partners. For each business process, retail executives should ask themselves whether a blockchain-enabled process would be optimal if they were starting from scratch.
Key Findings

Our study identified the following key considerations for retailers to succeed with blockchain.

• **Rewriting the rules of competition.** Eighty-seven percent of respondents said they believe blockchain is important to the future of the retail industry. As retailers struggle to maintain margins, the increased efficiency of blockchain-enabled processes will allow retailers to reduce costs: 82% of respondents predicted that blockchain would yield cost savings for their organization of more than 2.5% by streamlining operations and automating manual tasks.

• **Developing a blockchain strategy.** Despite its far-reaching implications, many retailers have not invested sufficiently in understanding blockchain’s potential, developing use cases, and acquiring needed experience and talent. Retailers need to identify the concrete business problems that blockchain can address and then develop specific use cases. For each use case, the organization should specify the actions needed for implementation.

• **Selecting a blockchain platform.** The future direction of the blockchain ecosystem remains unclear, and respondents are divided on what type of ecosystem will emerge: 43% predicted that a sustainable private blockchain will prevail, while 27% said they foresee a sustainable open blockchain. We believe that private blockchains will lead in the near term, where retailers can tailor the standards to their specific business requirements. Over time, it’s likely that public blockchain networks and hybrid models (combining aspects of public and private networks) are likely to also gain acceptance.

Retailers should choose the platform that best meets the business requirements of each use case, considering such issues as needed functionality (e.g., smart contracts); the requirements for privacy, security, scalability and speed; and the level of business risk.

• **Understanding blockchain’s retail application.** Retail leaders need to educate themselves on blockchain capabilities and how the technology can help address organizational pain points. Half of the study’s respondents said that understanding blockchain use cases was one of the greatest barriers to adoption. A related issue is the challenge of communicating blockchain to key decision makers (53%). Establishing a dedicated blockchain team can help drive strategy development by helping organizations stay current with the latest developments, develop use cases and proofs of concept, and work with business partners.

• **Closing the talent gap.** Retail organizations will need to develop or acquire additional skills and expertise to succeed with blockchain; however, many respondents appear to be underestimating the talent challenge, especially when it comes to technical skills. In our experience, retail organizations will find they need additional blockchain skills in areas such as Public Key Infrastructure (PKI), or cryptography, information architecture, software engineering, network infrastructure and integration, and user interface/user experience.
Although still in a nascent stage, blockchain appears destined to restructure operating models and competitive requirements across the retail industry.

- **Overcoming external roadblocks.** Privacy and security (74%) were the issues cited most often as a top external roadblock to blockchain adoption. Regarding privacy, permissioned blockchain networks are working actively to design methods to allow enterprise users to limit access to their data. Legal and regulatory issues (65%) were also seen as a big obstacle by many respondents. To deal with regulatory uncertainty, retailers will need to be alert and proactive. Finally, 63% of respondents named scalability/latency as a top obstacle. When choosing a platform for a use case, retailers should assess the speed and scalability required, keeping in mind that performance claims made by platform vendors regarding speed should be independently confirmed.

- **Becoming comfortable with collaboration.** Although blockchain could be applied to internal processes, the greatest benefits will result from collaborative efforts with external organizations such as supply chain partners. However, few respondents say they are actively working with partners on blockchain projects, and 60% of respondents note that working with partners/ecosystem members is one of the top external obstacles to adoption.

  In their efforts to collaborate with external partners/stakeholders, respondents reported significant challenges in identifying and finalizing blockchain use cases (52%); developing monetization approaches (43%); agreeing to a shared data model between parties for use in the blockchain (40%); and establishing connectivity with partner systems (39%). Retailers need to recognize that it will take time, and intense cultural change, for employees and supply chain partners to become comfortable sharing heretofore private data, a transition that will require a good deal of change management therapy.

Although still in a nascent stage, blockchain appears destined to restructure operating models and competitive requirements across the retail industry. Yet, many retailers are waiting for blockchain networks to consolidate and for optimal retail applications to become readily apparent. Retailers that take a wait-and-see approach will find it difficult to catch up once the direction for blockchain in the retail industry crystalizes.

Instead, retailers should get in the game today to ensure they are not left behind by competitors that have moved quickly to influence network rules and to leverage blockchain to enhance operational efficiency and drive down costs.
REWRITING THE RULES OF COMPETITION

Traditional retailers face a challenging business environment, marked by continuing margin pressure, encroaching efforts of digital-native rivals and greater global competition. At the same time, they must contend with issues such as limited supply chain visibility, empowered consumers, high transaction fees and the need to battle counterfeit products.

Blockchain has the potential to address these and other issues faced by retailers today. First used in 2009 for the digital crypto-currency Bitcoin, blockchain technology has extended far beyond the financial services industry and impacted nearly every major industry, including retail. Blockchain provides a way to conduct and record transactions through a peer-to-peer network that replaces the traditional role of a central trusted authority.

Blockchain networks create proof of ownership by using unique digital signatures that rely on both public encryption keys known to everyone on the network and private keys known only to the owner.

Blockchain networks create proof of ownership by using unique digital signatures that rely on both public encryption keys known to everyone on the network and private keys known only to the owner. Complex algorithms drive consensus among users, ensuring that transaction data cannot be tampered with after they are verified, reducing the risk of fraud. "Smart contracts" can be created that execute automatically once their terms are met, without the need for human intervention.  

Blockchain platforms can be public (i.e., permissionless), like Bitcoin, with anyone allowed to submit a transaction and take part in validating other transactions. Or they can be private (i.e., permissioned), where only authorized participants can share and validate information. Private blockchains pivot around reputational investment of the actors that participate in the network. This allows for innovations that address the speed, privacy and scalability concerns of public blockchains while reinforcing the validity of transactions.

For retailers, blockchain holds the promise of delivering trust in a product, transaction or the integrity of data more effectively and at lower cost than ever before. Blockchain applications could help retailers improve supply chain visibility, ensure product provenance and authenticity, speed up transactions, reduce processing fees, and improve the management of networked loyalty programs (see Quick Take, page 9).
Given blockchain’s potential benefits, it is not surprising that 87% of respondents said the technology will be important to the future of their industry, including 46% who said it will be very important (i.e., it will fundamentally transform the industry). Similarly, 80% of respondents said they believe that blockchain will be important or very important for retailers to stay competitive in the years ahead.

A number of leading retailers are actively gaining expertise and exploring the potential of blockchain-enabled solutions. For example, in May 2017, Walmart applied for a patent for a system that would use blockchain technology to track packages delivered by drones. Target is reportedly hiring blockchain experts to build its capabilities.

The most frequently cited reasons for pursuing blockchain pivot around gaining competitive advantage (70%) and harnessing its perceived benefits (68%). In contrast, relatively few respondents said their organization is pursuing blockchain for defensive reasons, such as keeping up with the competition (36%) or warding off business disruption (14%).

Blockchain is expected to have a wide impact across retail organizations, with a high level of impact anticipated in finance (44%), IT (44%), operations (44%) and data management (39%) functions (see Figure 1). This is consistent with the notion that respondents often said they expect that blockchain will yield benefits in improved data management (52%), process automation (43%) and cost efficiencies (40%) (see Figure 2, next page).

As retailers struggle to do more with less in a margin-squeezed environment, the potential for blockchain to reduce operating costs is one of its principal attractions. Blockchain adoption will result in cost savings of more than 2.5% according to 82% of respondents, while 36% said they believe the savings will be greater than 5%. Much of the cost savings could result from automation, with 76% of respondents predicting that blockchain will allow their organization to automate more than 2.5% of its jobs.

**Blockchain Impact on Business Functions**

Indicate the impact of blockchain on the following functional areas.

<table>
<thead>
<tr>
<th>Functional Area</th>
<th>High</th>
<th>Medium</th>
<th>82%</th>
<th>79%</th>
<th>76%</th>
<th>71%</th>
<th>69%</th>
<th>68%</th>
<th>65%</th>
<th>64%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operations</td>
<td>44%</td>
<td>46%</td>
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<tr>
<td>IT</td>
<td>44%</td>
<td>39%</td>
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<tr>
<td>Supply Chain Management</td>
<td>32%</td>
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<tr>
<td>Finance</td>
<td>44%</td>
<td>35%</td>
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<td>HR</td>
<td>38%</td>
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<tr>
<td>Data Management</td>
<td>39%</td>
<td>32%</td>
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<tr>
<td>Logistics</td>
<td>28%</td>
<td>41%</td>
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<tr>
<td>Marketing</td>
<td>36%</td>
<td>33%</td>
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<td></td>
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<tr>
<td>Compliance</td>
<td>27%</td>
<td>41%</td>
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<tr>
<td>Procurement</td>
<td>23%</td>
<td>42%</td>
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<td></td>
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<tr>
<td>Customer Service</td>
<td>28%</td>
<td>36%</td>
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<td></td>
<td></td>
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</tbody>
</table>

*Figure 1*
Other important benefits of blockchain cited by respondents are reduced fraud (32%) and reduced counterfeiting (31%). Blockchain could be used to provide consumers with the assurance that products are authentic, and 73% of respondents said that a tamper-proof, digital transaction history would provide a high or very high degree of value to their customers. For example, one sneaker manufacturer is using blockchain and 3-D-printed smart tags to prove product authenticity. Provenance, a start-up, is using blockchain to record each step that a product takes in the global supply chain and allow consumers to access the information by scanning a QR code.

As retailers struggle to do more with less in a margin-squeezed environment, the potential for blockchain to reduce operating costs is one of its principal attractions.

**Expected Benefits**

Indicate the top five expected benefits of adopting blockchain.

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved data management</td>
<td>52%</td>
</tr>
<tr>
<td>Process automation</td>
<td>43%</td>
</tr>
<tr>
<td>Cost efficiencies</td>
<td>40%</td>
</tr>
<tr>
<td>Greater transparency</td>
<td>36%</td>
</tr>
<tr>
<td>Fewer back-office tasks</td>
<td>35%</td>
</tr>
<tr>
<td>Reduced fraud</td>
<td>32%</td>
</tr>
<tr>
<td>Streamlining of processes</td>
<td>32%</td>
</tr>
<tr>
<td>Reduced counterfeiting</td>
<td>31%</td>
</tr>
<tr>
<td>Heightened security</td>
<td>30%</td>
</tr>
<tr>
<td>Improved auditing</td>
<td>29%</td>
</tr>
<tr>
<td>Improved information to customers</td>
<td>25%</td>
</tr>
<tr>
<td>Reduced infrastructure burden</td>
<td>21%</td>
</tr>
<tr>
<td>Improved compliance</td>
<td>19%</td>
</tr>
<tr>
<td>Improved market responsiveness</td>
<td>17%</td>
</tr>
<tr>
<td>Lower transaction costs</td>
<td>15%</td>
</tr>
<tr>
<td>Improved record keeping</td>
<td>15%</td>
</tr>
<tr>
<td>Improved inventory management</td>
<td>4%</td>
</tr>
</tbody>
</table>
Blockchain’s Retail Potential Spans the Gamut

Blockchain could help retailers address a variety of pressing business issues, including the following:

- **Improving inventory management.** With the increasing complexity of SKU management and shorter product life cycles, sales forecasting has become more difficult for national fashion apparel retailers. These retailers and their supply chain partners could implement a blockchain solution that provides a single source of truth and uses smart contracts to enable the automatic execution of payments and orders. The improved supply chain visibility would increase operating efficiency and allow more accurate forecasts, preventing over-ordering and minimizing lost sales due to stock-outs.

- **Ensuring product authenticity.** The proliferation of forgeries that are difficult to identify can result in declining sales and a deterioration in the value of genuine products for designers of luxury consumer goods. A blockchain solution can renew trust by allowing customers to scan a code permanently etched into the product and access the entire history of the product, including the chain of ownership.

- **Tracking provenance.** Grocery retailers specializing in organic and GMO-free food products would benefit from the ability to shore up confidence among consumers suspicious that organic labels are just a marketing tool and strategy to charge higher prices. Supermarket chains and their supply chain partners could deploy a blockchain solution to raise confidence in their products by allowing customers to track the journey of a product from the farm to the store.

- **Enhancing customer loyalty/rewards programs.** More than $117 billion in consumer loyalty rewards are issued by U.S. businesses each year, and many companies today have expanded their programs to cover multiple brands in an effort to increase customer satisfaction while reducing their liability. Con- sumers struggle to track the many loyalty programs they are enrolled in, and many of the loyalty points created each year go unused, resulting in balance sheet liabilities. A blockchain application would allow users to easily redeem points across different merchants and platforms (e.g., iOS, Android and web), improving customer satisfaction and reducing liabilities, while also cutting operating costs and decreasing the potential for fraud.

Many of these examples will pivot on Internet of Things’ (IoT) sensors and related instrumentation to bump blockchain from its infrastructure roots into a catalyst for delivering what some pundits have dubbed the Internet of Value. Projects such as the Genesis of Things, which marries blockchain’s shared infrastructure with 3-D printing, exemplify how this emerging technology can elevate trust and introduce new market opportunities for manufacturers, logistics companies and retailers across the value chain. (For more on this topic, see our white paper “How Blockchain can Slash the Trust Tax.”)
DEVELOPING A BLOCKCHAIN STRATEGY

Given its wide range of potential applications and required changes in infrastructure-level processes, blockchain is considered by some to be more disruptive than the advent of the commercial Internet. The degree of change, some believe, could exceed those required by retailers that joined the e-commerce revolution in the late 1990s.

As a result, retailers need to move quickly to gain experience with blockchain technology and understand how it will impact their organizations. The Internet’s commercial coming of age is instructive. Rather than explore this new sales channel, many retailers decided to wait until it was clear whether online shopping would be accepted by consumers. By the time the competitive threat from online merchants went from pipe dream to blatant reality, many retailers found themselves at a disadvantage to born-digital competitors that had captured first-mover advantages.

With blockchain, early adopters will influence the development of networks and consortia, including the choice of participants and governance rules. By road-testing potential applications, early adopters can develop and test pilot applications quickly, while assessing their internal readiness to support blockchain solutions.

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Retailers that move quickly to test blockchain will gain a better understanding of potential use cases, develop an appreciation of their costs and benefits, identify their internal strengths and weaknesses, and begin planning with their supply chain partners. The result will extend beyond early operational efficiency gains and reduced costs to accelerated time-to-value from full-scale adoption of pilot projects that prove successful and deliver competitive differentiation (i.e., quality improvements that drive strategic advantage from a reputational perspective).

While nearly all respondents said blockchain will be important to their company’s success, only a minority said they have taken steps to prepare for its adoption. A total of 39% of respondents said their organization has identified the functional areas and business processes that could be impacted by blockchain, and an additional 55% said they are currently in the process of making this assessment.

Today, blockchain involves more theory than practice. Retailers need to make it real, identifying concrete business problems that the technology can address and tangible benefits it will generate. For each use case, the organization should:

- Specify the actions needed for implementation.
- Assess the resources required, create a process map and develop an implementation guide.
- Determine KPIs that can be used to evaluate success. The KPIs will not only allow the organization to assess performance but can also help to communicate value to senior management.
Developing an Effective Blockchain Strategy

Retailers need to develop a cohesive blockchain strategy rather than taking on projects in a piecemeal fashion. Strategy considerations include:

- **Blockchain projects should be driven by cross-functional teams with a business sponsor.** Ensure the blockchain project addresses specific business problems or opportunities. Rather than emanating from IT, the initiative should involve business stakeholders from the outset.

- **Set clear goals.** Assess whether blockchain technology is well suited to the business issue being addressed and clearly specify which objectives will be achieved.

- **Don’t wait until costs and benefits are clear.** Learning will be iterative, and costs and benefits may only become defined more clearly as the project progresses. In addition, many reasons to move forward are strategic in nature and cannot be quantified at the outset.

- **Stay flexible.** Recognize that blockchain is still in the early stages of development; innovation will continue, and the infrastructure will evolve.

- **Explore a variety of platforms, including both permissioned and permissionless.** For each use case, choose a platform based on how well it is tailored to the business need, and not the one with the most buzz.

- **Gain experience collaborating with other players across the value chain.** Don’t underestimate the importance - and challenge - of managing people to create an effective culture of collaboration. Work with industry partners on blockchain projects and assess the obstacles in working successfully with external organizations.

- **Focus on blockchain projects with real-world potential.** The risk of doing nothing is greater than the risk of doing the wrong thing.
Developing a blockchain strategy should not be seen narrowly as a technology issue, but instead should involve stakeholders from across the business at the outset (see Quick Take, previous page). A blockchain pilot project may demonstrate how the technology works, but it is even more important to learn whether the project is an optimal solution for the business problem being addressed and how a full-scale implementation would impact the organization’s business processes and technology.

Not surprisingly, our study did not detect consensus among retail respondents on how their organizations are pursuing blockchain. Many respondents cited approaches that rely on investments or partnerships with external organizations: 29% said their organization had invested in a start-up/established company, and 14% said the organization is partnering with a start-up. Only 10% said their organization is collaborating with an established vendor. Other respondents reported that their organization is pursuing an internal approach: 26% said the organization was pursuing blockchain internally, and 21% said their organization had acquired a small/medium-size start-up focusing on a specific niche area.

SELECTING A BLOCKCHAIN PLATFORM

The future shape of the blockchain ecosystem is still to be determined, and respondents had a range of opinions regarding its future direction. The most common view, held by 43% of respondents, is that a sustainable private blockchain will emerge. However, other respondents predicted the emergence of a sustainable open blockchain (27%), a consortia-based blockchain (13%) or a combination of private and consortia-driven blockchains that are in part connected to a public blockchain (12%).

We believe it is unlikely that one blockchain will dominate the retail industry given the varying business requirements of different use cases. Instead, we expect blockchain networks will consolidate around a small number of platforms – both public and private – that will meet the demand for different capabilities. Private (permissioned) blockchains may prove most appropriate for accounting or supply chain management since they can be limited to selected participants, provide the ability to modify the network’s rules as needed and offer greater security. Retailers may adopt a public (permissionless) blockchain to allow customers to access information, such as managing loyalty rewards or to see the provenance of their products.

We believe it is unlikely that one blockchain will dominate the retail industry given the varying business requirements of different use cases. Instead, we expect blockchain platforms will consolidate around a small number of platforms.
Retailers should gain experience with open-source platforms to help prevent lock-in. However, it is important to recognize that some open-source networks attempt to lock in participants through other means, such as requiring the use of proprietary services or the need to make substantial infrastructure investments.
Given the uncertainty of future blockchain ecosystem structures, retailers should gain experience with a variety of platforms, both public and private. Retailers might start with permissioned blockchains and then test public blockchain platforms as they become more comfortable with the technology. Respondents said their organizations are exploring a variety of platforms, most often citing Bitcoin (46%) and Ripple (43%). Several other platforms were named by roughly one-third of respondents, including both infrastructure and solution offerings from a variety of companies (see Figure 3).

Permissioned blockchains are likely to be the leaders in the immediate future because retailers can customize standards to their specific requirements. Permissioned platforms have different capabilities, such as those that are optimized for smart contracts like Corda, Hyperledger and Monax. Businesses have recently sought our help in exploring permissioned platforms such as Corda, Hyperledger Fabric, MultiChain and Monax.

Differentiation among public networks is also occurring, such as Bitcoin’s strength as a cryptocurrency and Ethereum’s in smart contracts. Hybrid models continue to emerge, such as the efforts to build an enterprise version of Ethereum, called Quorum, with increased privacy, stability and speed. Open, permissionless platforms will not take hold until the industry coalesces around a public platform, where each retailer will need to adopt industry-wide standards.

**Platforms Aplenty**

Which of the following platform(s) have you explored for blockchain projects?

![Figure 3](image-url)
Retailers should choose the platform that can best meet the business needs of each use case. This assessment should consider:

- **Applicability.** Does the platform possess features, such as smart contracts, that meet the needs of the business use case?

- **Capability.** Does the technology meet the business requirements for privacy, security, scalability and speed?

- **Business risk.** Does the platform create unacceptable levels of business risk? For example, retailers should consider whether a platform has reasonable long-term prospects, such as having gained some traction and diverse developer support, or if there is the potential for vendor dependency stemming from strict IP rights or platform lock-in.

Retailers should gain experience with open-source platforms to help prevent lock-in. However, it is important to recognize that some open-source networks attempt to lock in participants through other means, such as requiring the use of proprietary services or the need to make substantial infrastructure investments.

**UNDERSTANDING BLOCKCHAIN’S RETAIL FIT**

In our assessment, retailers have yet to take the steps required to manage the dramatic changes blockchain will introduce. From senior management to middle management, retailers need to educate themselves on the new capabilities and opportunities blockchain provides to advance their business objectives. Given blockchain’s rapid progress in financial services, retailers should be networking with their counterparts across the industry to stay abreast of the latest developments, applications and best practices. (For more insight, see our white paper “Financial Services: Building Blockchain One Block at a Time.”)

When respondents were asked to name the most important internal barriers to blockchain adoption by their organization, the issues cited often revolved around a lack of understanding of use cases, including evaluating the cost-benefits of use cases (54%), understanding blockchain use cases (50%) and uncertainty around time needed to start reaping benefits (47%) (see Figure 4, page 16).

When asked why they are reluctant to adopt blockchain, more than 40% of respondents cited reasons relating to the lack of a clear understanding of how the technology can benefit their organization. Top responses included a need to better understand how blockchain can solve their business problems (45%), lack of fleshed-out retail use cases in the public domain (44%) and unclear cost-benefits and approach for blockchain experimentation (43%).

To some degree, the expectation that an organization can precisely determine the expected costs and benefits of a blockchain project at this stage may be unrealistic, given that blockchain is in an early stage of development. The costs and benefits of a project are typically long-term in nature, since blockchain is a journey that, in some cases, requires infrastructure and process change. Yet, an organization should be able to specify the objectives that each project is designed to achieve to create a yardstick to judge success.

Not only is it difficult for those responsible for blockchain to assess use cases, but respondents also find it difficult to communicate with senior management, who understandably are even less familiar...
A dedicated team can help drive the development of strategy by identifying and developing use cases, exploring the potential of working with business partners and researching partnerships with vendors.

with the technology and its capabilities. Communicating blockchain to key decision makers (53%) was cited as a top internal barrier.

A first step in developing a strategy is to ensure the organization has a strong expert or thought leader driving the blockchain initiative. Organizations also need to create a structure to ensure their blockchain expert is not simply window dressing but is tasked with tangible goals. Retailers should also establish dedicated blockchain teams, identify use cases for innovation and/or create task forces across business units, with stakeholders assigned to spur blockchain innovation and adoption.

A dedicated team can help drive the development of strategy by identifying and developing use cases, exploring the potential of working with business partners and researching partnerships with vendors. A dedicated team can also find feasible blockchain solutions quickly by establishing and testing small-scale proofs of concept.

In our experience, blockchain is more of a business challenge than a technological one, and in fact, only 18% of respondents cited integrating legacy systems with blockchain networks as one of the top barriers to adoption. Retailers are looking to integrate blockchain applications with their exist-

Internal Obstacles to Blockchain Adoption

![Bar chart showing top five internal barriers to adopting blockchain technology](image)

What are the top five internal barriers to adopting blockchain technology for your organization?

- Evaluating cost-benefits of use cases: 54%
- Communicating blockchain to key decision makers: 53%
- Understanding blockchain and use cases: 50%
- Uncertainty around time needed to start reaping benefits: 47%
- Understanding legal and compliance issues: 40%
- Reengineering business process: 39%
- Securing budgets: 39%
- Other technology investments are taking priority: 39%
- Procuring talent and expertise: 38%
- Ensuring data security: 34%
- Gaining buy-in from organizational leaders and internal divisions such as compliance, IT, etc.: 18%
- Integrating legacy systems with existing enterprise architecture: 18%
- Culture and change management: 6%
ing legacy systems wherever possible, rather than make extensive changes. Besides, ripping out an entire legacy system would require a massive investment and likely undermine the value proposition for a blockchain project.

Forty-eight percent of respondents said their organization plans to replace some parts of their legacy system to enable blockchain adoption, while 21% said they are looking to keep their legacy system as-is, and deploy blockchain by using hybrid solutions. Only 20% of respondents said their organization has identified core legacy systems that can be enabled or even replaced by blockchain solutions.

CLOSING THE TALENT GAP

Retailers face challenges in securing blockchain talent, and 39% of respondents consider procuring talent and expertise to be one of the top internal barriers to its adoption. So far, 42% of respondents said their organization has assessed the internal skills/talent requirements to support a blockchain initiative, although 50% said that such an assessment is in progress.

Many respondents acknowledged that their organization will need additional blockchain expertise in a variety of areas, including risk management (58%), legal (56%), compliance (56%), cybersecurity (54%) and business strategy (49%) (see Figure 5, next page). However, we believe that many respondents are underestimating the additional blockchain expertise that will be required.

This is especially the case in the area of technical skills, where only 37% of respondents believed their organization will need additional expertise.

This is especially the case in the area of technical skills, where only 37% of respondents believed their organization will need additional expertise. In our experience, most retail organizations will discover that they need more expertise in blockchain-specific areas such as PKI infrastructure, information architecture, software engineering, network infrastructure and integration, and user interface/user experience, among others.

Retail organizations are using a mix of internal and external strategies to close the talent gap. The most common internal strategies for obtaining needed blockchain skills were innovation labs (56%), training (such as attending technical workshops) (49%) and hiring new workers (43%) (see Figure 6, next page). But retailers are also using a variety of external strategies to acquire additional expertise, including partnerships with blockchain technology companies (47%), targeted acquisitions (40%) and investing in start-ups (36%).
The appropriate mix of internal and external strategies will depend on the characteristics of the organization, especially its risk tolerance and cultural acceptance of change. For example, retailers with a lower tolerance for risk will likely favor partnerships and blockchain-as-a-service offerings because they require less upfront investment and can be more easily terminated, even though the potential payoff is lower. At the other end of the risk spectrum, acquiring specialized blockchain talent and integrating it into an established retail organization could prove to be a more lucrative avenue if successful.

Blockchain Skills Gaps

What is your organization’s level of blockchain expertise in the following areas?

<table>
<thead>
<tr>
<th>Area</th>
<th>0%</th>
<th>20%</th>
<th>40%</th>
<th>60%</th>
<th>80%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk management</td>
<td>12%</td>
<td>47%</td>
<td>58%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legal (including smart contracts)</td>
<td>13%</td>
<td>44%</td>
<td>56%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliance</td>
<td>19%</td>
<td>37%</td>
<td>56%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cybersecurity</td>
<td>10%</td>
<td>44%</td>
<td>54%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business strategy (ability to identify use cases)</td>
<td>3%</td>
<td>47%</td>
<td>49%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical</td>
<td>2%</td>
<td>35%</td>
<td>37%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

We do not have any expertise | Some expertise, but not enough

Figure 5

Bridging Talent Shortcomings

How is your organization addressing the potential skillset gap created by blockchain?

<table>
<thead>
<tr>
<th>Method of Bridging Talent Shortcomings</th>
<th>0%</th>
<th>10%</th>
<th>20%</th>
<th>30%</th>
<th>40%</th>
<th>50%</th>
<th>60%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation labs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>56%</td>
</tr>
<tr>
<td>Training</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>49%</td>
</tr>
<tr>
<td>Partnering with blockchain technology companies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>47%</td>
</tr>
<tr>
<td>Hiring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>43%</td>
</tr>
<tr>
<td>Targeted acquisitions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>40%</td>
</tr>
<tr>
<td>Investing in startups (incubation)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>36%</td>
</tr>
<tr>
<td>Offering incentives to retain key employees</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>24%</td>
</tr>
<tr>
<td>We are not facing such issues</td>
<td>3%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No plans as of now</td>
<td>3%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 6
OVERCOMING EXTERNAL ROADBLOCKS

In addition to better understanding the benefits blockchain can provide for their organization and developing the required talent, retailers must also overcome significant external barriers (see Figure 7, page 21).

Privacy and Security

The external roadblock to adoption cited most often by respondents was privacy and security (74%). The concern over privacy is primarily with respect to permissionless blockchains such as Bitcoin and Ethereum. In particular, Bitcoin is built on the principles of data transparency and anonymity. However, retailers want the ability to limit access to data on their supply chain partners and customers.

Although still untested for enterprise use cases, much of the innovation underway in permissioned blockchain platforms is designed to provide the ability for participants to limit access to their data.

Some of the top innovations that permissioned blockchains have developed include:

- **Channels.** These allow peers to “subscribe” to what can be characterized as an independent chain of blocks where the information is only available to peers with access to the channel.

- **Specialization of nodes.** For example, R3 has the concept of notaries, which are specialized nodes that the parties can designate to validate the transaction and thus prevent double spend. The other nodes on the network are not able to see any details of the transaction, which helps maintain privacy.

While many respondents are concerned about security, blockchain networks provide much higher levels of security and data protection. The concerns over blockchain security can be compared to the fear of self-driving cars. People expect self-driving cars to have a spotless safety record, and whenever one is involved in an accident, this is cited as evidence that the technology cannot be trusted. In reality, most vehicle accidents are the result of human error, and self-driving cars are expected to be much safer than traditional vehicles. As with other technologies, it takes time for people to become comfortable with a new technology, which we believe will also occur with blockchain.

Legal and Regulatory Issues

Legal and regulatory issues, cited by 65% of respondents, present another important roadblock to adoption. To date, there has been little indication of how regulations may change to address blockchain applications, especially in developing economies. The lack of direction by regulators creates a grey area that could slow investment.

In particular, some organizations may fear that future consumer privacy laws and regulations could require early-mover implementations to be overhauled to remain in compliance. For instance, the inherently indelible nature of blockchains could violate legislation concerning a consumer’s “right to be forgotten.” To make sure their implementations meet regulatory standards, organizations need to astutely focus on technology architecture decisions, such as what data can be stored on-chain vs. off-chain. Further, retailers must closely follow regulatory developments as compliance standards catch up and adjust to a blockchain-enabled future.
To make sure their implementations meet regulatory standards, organizations need to astutely focus on technology architecture decisions, such as what data can be stored on-chain vs. off-chain.
**Scalability/Latency**

Blockchain platforms are working to improve scalability and latency, which was named by 63% of respondents as one of the top barriers to adoption. Ripple announced its Ripple Consensus Ledger that can handle nearly 1,000 transactions per second, and the speeds of blockchain networks are expected to continually rise. Retailers should assess the speed required for specific use cases. For example, a blockchain application employed for a supply chain may have much lower transaction volumes than a consumer-oriented application such as managing loyalty rewards or tracking provenance/authenticity.

Although blockchain platforms often promote their speed, retailers should remember that these claims may not be achievable in practice. When testing speed, retailers need to make sure they are assessing the time required for the complete process, from transaction initiation to final confirmation. Some platforms quote fast times that are misleading because they don’t incorporate the entire lifecycle of the transaction.

**External Roadblocks**

![Figure 7](image)

**BECOMING COMFORTABLE WITH COLLABORATION**

Although applying blockchain thinking to internal processes may yield limited benefits, the greatest opportunities to generate value will require retailers to work collaboratively with outside organizations, such as their supply chain partners. Disseminating information quickly and efficiently among partners across the supply chain is one of the primary reasons for using blockchain.

Consider a simplified supply chain comprised of a manufacturer, a shipping outfit and a retailer. Today the three companies maintain separate sets of books, and transactions are recorded separately by each organization. A blockchain solution would replace the three sets of books with a single ledger supported by smart contracts. The benefits for all three companies would include lower operating costs, no need for reconciliation, greater accuracy and faster payments.

Respondents believe that collaborating and sharing data with suppliers and other blockchain partners will yield significant benefits for retailers in a number of areas: strengthened partnerships with vendors/suppliers (42%); improved inventory management (44%); increased data transparency to improve supply chain efficiency (40%); and reduced total cost of doing business (36%).
However, sharing data and working collaboratively with outside organizations are not activities that retailers are accustomed to doing. Sixty percent of respondents said that working with partners/eco-system members is one of the top obstacles to blockchain adoption.

Few respondents said their organization is currently working on blockchain either with its supply chain partners or with other groups across the industry. Only 23% of retail respondents reported that their organization has started working with external supply chain partners on blockchain, although 38% said this was in progress. Similarly, only 20% of respondents said their organization was working with other industry partners/competitors, while 36% said this was in progress.

Working with external partners/stakeholders presents significant challenges, with roughly three-quarters or more of respondents reporting challenges of medium or high difficulty (see Figure 8). The issue cited most often by respondents as presenting a high level of difficulty was identifying and finalizing blockchain use cases (52%), which respondents also named as a major internal challenge. The other highly difficult issues named by many respondents were developing monetization approaches (43%); agreeing to a shared data model between parties for use in the blockchain (40%); and establishing connectivity with partner systems (39%).

Working collaboratively and sharing data with external stakeholders, partners and even competitors will require a significant culture change in the way most retailers have traditionally conducted business. Many appear to underestimate the challenges in changing long-standing assumptions and business practices. Only 6% of respondents cited culture and change management as a top internal barrier to blockchain adoption.

### Challenges in Working with External Parties

Indicate the level of difficulty involved in the following while working with external partners/stakeholders.

- Establishing connectivity with partner systems: 39%, 53%, 92%
- Identifying and finalizing blockchain use cases: 52%, 39%, 92%
- Choosing which blockchain platform to work on: 30%, 56%, 86%
  - Agreeing to a shared data model between parties for use in the blockchain: 40%, 44%, 84%
  - Developing monetization approaches: 43%, 41%, 84%
- Convincing partners to share experiment data: 35%, 42%, 77%

Figure 8
Retailers need to recognize culture change will be required for their employees to become comfortable collaborating with external organizations, and equally for their external partners to appreciate the benefits of closer collaboration. The largest retailers wield the buying power to require supply chain partners to share data in a blockchain application, but smaller retailers may face an uphill battle to secure buy-in. Retailers need to educate their supply chain partners on the benefits they will receive from collaborating to implement a shared blockchain application.

**LOOKING FORWARD**

As retailers – both traditional retailers and born-digital rivals – seek ways to compete more effectively in today’s omnichannel world, blockchain’s distributed ledger technology provides an opportunity to increase operational efficiency and drive down costs.

Some leading companies are moving aggressively to assess how blockchain can address their business issues, acquire needed expertise, identify use cases and develop proofs of concept. Yet, most retail organizations are sitting on the sidelines, reluctant to invest in a new technology that will require them to overhaul hard-coded ways of doing business and embrace collaboration throughout their organization and with external partners.

Retailers need to get in the game by identifying use cases, designing pilot projects with specific implementation plans and acquiring blockchain skills, either internally or through acquisitions or partnerships.

But it is important that retailers avoid the pattern of many IT projects that are massive in scale, time-consuming to implement, and slow to meet expectations, if they succeed in doing so at all. Instead, a more nimble, entrepreneurial approach is required to keep pace with fast-changing blockchain technology, which can be summarized as: start small, fail fast, identify what works, and scale quickly.

Retailers that move rapidly to understand how blockchain can benefit their organization and develop the needed skills will capture a lead on their competitors as blockchain restructures the hyper-competitive retail landscape.
METHODOLOGY

We conducted an online survey of 321 respondents familiar with blockchain from retail organizations, between January and early March 2017. When asked to describe their level of understanding of blockchain, 17% described themselves as expert, 47% as proficient, 27% as competent, and 9% as beginner or novice.

Sixty-three percent of respondents are from Europe, and 37% from North America. Respondents work in a variety of industry segments, including grocery (13%), electronics (12%), discount retail (11%), membership club (11%) and apparel (11%) (see Figure 9).

Respondents have the following titles: 31% C-suite, 25% vice-president, 24% senior manager and 20% director.

Respondents work in the following functional areas: 23% in IT, 23% in operations, 23% in R&D/innovation, 21% in strategy, 8% in compliance and security, and 2% in legal.

Respondents come from various-sized retail organizations: 17% with revenues of $1 billion or less; 26% with revenues of more than $1 billion to $10 billion; 27% with revenues of more than $10 billion to less than $20 billion; 22% with revenues of $20 billion to less than $50 billion; and 8% with revenues of $50 billion or greater.

Industry Segments Represented

Which of the following best describes your organization?

- Grocery: 13%
- Specialty retail - electronics: 12%
- Discount retail: 11%
- Membership club: 11%
- Specialty retail - apparel: 9%
- Specialty retail - office: 8%
- Big box/supercenter: 8%
- Specialty retail - home improvement: 6%
- Convenience stores: 5%
- Pharmacy retail: 4%
- Specialty retail - auto parts: 2%
FOOTNOTES


2 Smart contracts are not unique to blockchain, but they are greatly enhanced by blockchain networks.


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ABOUT COGNIZANT BUSINESS CONSULTING

With over 5,500 consultants worldwide, Cognizant Business Consulting offers high-value digital business and IT consulting services that improve business performance and operational productivity while lowering operational costs. Clients leverage our deep industry experience, strategy and transformation capabilities, and analytical insights to help improve productivity, drive business transformation and increase shareholder value across the enterprise. To learn more, please visit www.cognizant.com/consulting or e-mail us at inquiry@cognizant.com.

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