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Emerging Technologies: The Competitive Edge for Finance and Operations

How market leaders are outpacing change with cloud-driven innovation

February 2020

Research conducted in partnership with ESG

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Executive Summary

They are the fundamental building blocks of a business: enterprise resource planning (ERP), enterprise performance management (EPM), and supply chain management (SCM) systems. For decades, they have kept office functions alive, operations humming, and goods and services flowing.

But the world is changing. In-house IT teams must advise the C-suite on strategic initiatives, not just maintain systems. Business leaders require real-time financial information to stay ahead of competitors. Consumers lack the patience to wait days for shipments to arrive. And supply chain partners are looking to execute transactions in ways that foster collaboration and build trust while getting products into customers' hands more efficiently.

How can organizations compete more effectively in light of these challenges? By infusing fundamental business systems with innovative technology capabilities.

Artificial intelligence (AI), internet of things (IoT), chatbots, and augmented reality are already mainstream staples that have changed the way consumers discover products, gain insight into their activities like exercise and sleep, get answers to frequently asked questions, and consume media in ways never before possible. In many cases, these technologies have been the status quo for consumers for years. The data in this report shows that applications for these technologies in the areas of finance and operations are emerging and maturing at a rapid pace. Now is the time for businesses to embrace AI, machine learning, IoT, blockchain, digital assistants, and augmented and virtual reality as powerful enhancements for finance and operations systems.

Key findings: Emerging technologies passed the tipping point, delivering on their promise

The greater the number of emerging technologies in use, the better the organization's performance. This is true whether discussing the achievement of market-leading performance in areas like financial reporting accuracy and planning capabilities, or supply chain metrics like reduced days sales outstanding (DSO) and percentage of orders delivered in full and on time (DIFOT).

This report details our findings on how organizations are capitalizing on emerging technologies to enhance finance and/or supply chain operations. Key learnings include:

58%

Organizations using the most emerging technologies have **grown their annual revenues 58% faster** than organizations not investing in these technologies.

80%

Organizations using the most emerging technologies have **grown their annual net income 80% faster** than organizations not investing in these technologies.

91%

91% of all respondents consider SaaS an enabler of emerging technology adoption.

84%

84% of organizations surveyed use at least one emerging technology in production today.

ROI

The benefits achieved with **emerging technologies are outpacing expectations by a wide margin.**

2:1

Organizations are **two- to three-times more apt to purchase prebuilt solutions** rather than building their own emerging technologies (stat varies by technology).

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Recommendations:

Five ways to transform finance and operations with emerging technologies

1. Modernize critical systems by migrating to SaaS.

Take advantage of IoT, machine learning, AI, and blockchain capabilities quickly and easily with cloud-based solutions. SaaS lets organizations scale quickly and realize real-time business value at a time when it pays to move fast.

2. Switch to prebuilt solutions with embedded emerging technologies.

Embedding emerging technology capabilities into proprietary apps is a challenging and expensive proposition, mainly because they're so highly customized. Cloud-based, prebuilt apps, on the other hand, present a perfect opportunity to get a head-start on modernizing critical finance and operations systems.

3. Pilot a project with a measurable goal and a likely payoff.

The research shows that emerging technologies can be applied in any number of ways for a variety of business results. As a result, identifying a preliminary project can be a daunting endeavor. We recommend selecting a specific process—ideally something manual and time-intensive—as a pilot project. These types of processes have plenty of room for improvement, which makes it easier to measure success. The payoff also tends to be greater, especially in terms of freed up human capital.

4. Don't get left behind: Invest now.

Many organizations continue to underestimate the value proposition of AI, IoT, digital assistants, and blockchain. That's a mistake: Failure to actively invest in these technologies to improve finance and operations increases the risk of falling behind the competition. Start researching solutions today that meet your business and technology requirements.

5. Embrace an agile mindset.

Our research findings indicate a strong need for C-suite support to make real progress on emerging technology initiatives. At organizations where the COO's understanding of IoT is lacking, only 14% use IoT to improve supply chain management. That compares with 64% of organizations with IoT-savvy COOs. If you are in a finance or operations leadership position, get outside your comfort zone, explore how these emerging technologies can improve your organization's performance, and provide employees with opportunities for upskilling.

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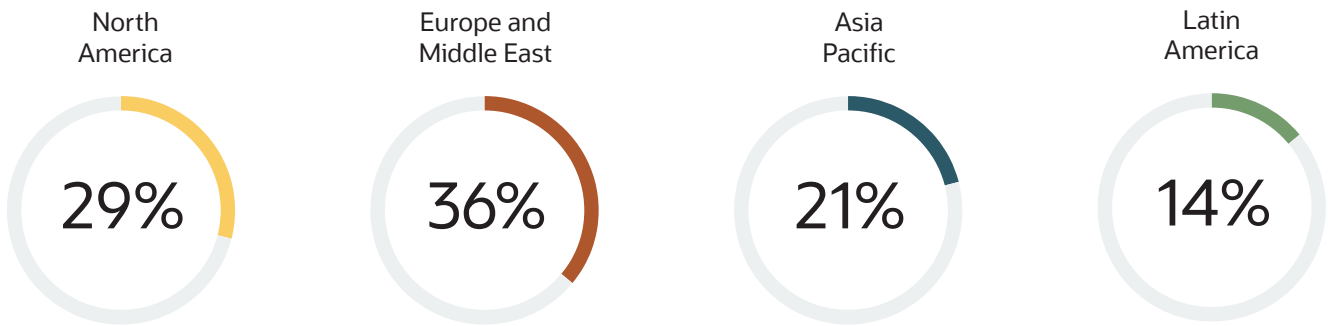
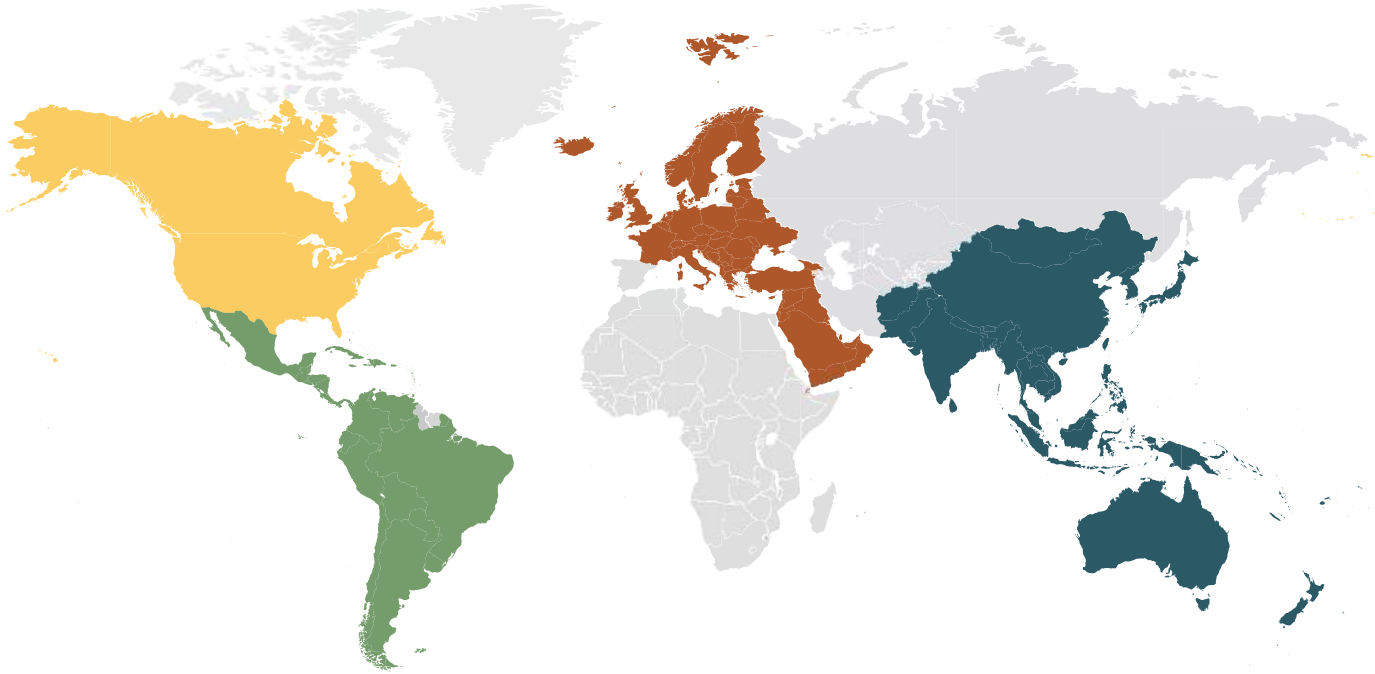
Research objective:

To understand the impact of emerging technologies on finance and operations, Oracle and ESG partnered to conduct a global survey of 700 finance and operations managers and executives who are regular users of ERP, EPM, and/or SCM applications on-premises and in the cloud. The survey was complemented by 10 in-depth interviews with finance and operations leaders from various industries. Unless otherwise noted, all data in this report originates from this primary research.

Geographic diversity of respondents





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Finance and Operations: From the Back Office to the Frontlines of Innovation

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Finance and Operations: From the Back Office to the Frontlines of Innovation

For decades, finance and operations teams have been thought of as back-office, expense-heavy functions ripe for cost cutting. But that's changing as the competitive landscape evolves. Fueled by today's on-demand economy, customer expectations are at an all-time high. Global economic and political tensions are increasing risk and uncertainty. And regulatory pressures continue to add complexity to everyday tasks.

85% of survey respondents believe it is imperative for the finance organization to transform from reporting on **"what" is happening in the business to "why"**

No longer is it enough for finance and operations to simply report financial results and streamline processes. Enlightened organizations are looking to these teams to make sense of their data to drive growth and innovation. In fact, 85% of survey respondents believe it is imperative for the finance organization to transform from reporting on "what" is happening in the business to "why" things are happening. At the same time, operations teams are being asked to anticipate customer demands and preempt supply chain disruptions. This seismic shift in responsibilities is even more pronounced among organizations founded in the last decade, 90% of which insist on extracting the "why" of the business from its data.

> "In the future, the amount of time we spend processing data will be vastly reduced [by emerging technologies], probably to about 5% of our productive time. We will spend the other 95% of our time actually analyzing the data. Today our time is evenly split."
>
> - CFO of an 18,000 employee healthcare organization

Catalysts for change

So how can finance and operations teams, once viewed as cost centers, evolve to meet these heightened demands while also maintaining budgetary discipline? One answer is to deliver strategic decision support and better business performance. A means to that end is to automate more processes using emerging technologies, so that finance and operations teams can focus less on transaction processing and tactical support (the "what") and more on strategy (the "why" and how to respond to it).

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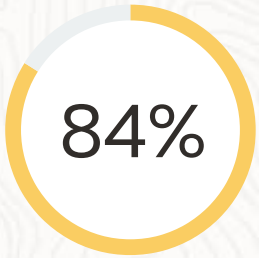
Up until now, organizations have primarily relied on ERP systems to oversee day-to-day transactional activity; EPM systems to report on, analyze, and manage the business; SCM systems to manage the flow of goods and services across the enterprise; and analytics to identify anomalous performance levels and take action where needed.

But in an environment of constant change, these systems are challenged to do more. Enter the current class of emerging technologies: artificial intelligence and machine learning; intelligent connected devices and the streams of data they produce; digital assistants and intelligent chatbots; blockchain technology; and augmented and virtual reality tools.



of organizations surveyed **use at least one emerging technology in production today** to enhance finance and/or supply chain operations

Together, these emerging technologies can push the existing boundaries of what finance and supply chain teams can do. In fact, many organizations are already well on their way to implementing these technologies. And for good reason: They can not only transform the way their functional teams operate, but also ultimately drive differentiation and a competitive edge for their organizations.

84% of organizations surveyed have at least one emerging technology in use today to enhance finance and/or supply chain operations. This appears to be a global trend, with 89% of organizations in the Asia-Pacific region using at least one technology, down to a low of 80% of companies represented in Latin America; North American and EMEA-based firms register at 83% and 82% respectively. However, leading companies—those adopting multiple emerging technologies—are the ones most likely to reap the greatest gains. Advantages range from predicting trends and shortening monthly close times to gaining operational efficiencies and minimizing risk exposure.

As adoption of these tools grows, so too will the divide between leaders and laggards. Differences in how organizations implement these technologies will also drive differences in the magnitude and timeliness of the value achieved.

Emerging technologies defined

Artificial intelligence (AI): Refers to systems or machines that simulate human intelligence to perform tasks. Using machine learning algorithms, AI solutions can continuously improve based on the information they collect. AI and machine learning, for example, can analyze massive amounts of data, finding patterns that a human would never see, and distribute data-driven insights throughout the organization. Examples of AI in action range from recommending products to predicting equipment malfunctions.

Internet of things (IoT): An extension of the internet and other network connections to different sensors and devices that enables to gather information, analyze data, and trigger actions leading to automation, remote monitoring, predictive maintenance, and more. It leverages capabilities such as real-time analytics, machine learning, digital twin, and digital thread.

Digital assistants: Rely on AI and natural language processing to mimic human conversations with machines—think software you can talk to, rather than interact with using a keyboard and mouse. Digital assistants are designed to respond instantly to complex questions, as well as provide recommendations, make predictions, and initiate conversations, based on a user's history and preferences. Unlike consumer versions of these products (e.g., Siri and Alexa), these digital assistants are designed to work in a secure corporate environment, answering questions about the company's key performance indicators, financial position, sales forecasts, and so on.

Blockchain: This decentralized ledger technology builds a growing list of immutable records (called blocks) that are linked together to form a chain that is securely shared among disparate trusted parties (both inside and outside the company). Transactions between these parties are transparent, verifiable, and unalterable, allowing organizations to foster trust among partners based on a single distributed source of truth. Benefits range from heightened security to lower costs resulting from minimized use of third-party intermediaries for financial transactions.

Augmented reality (AR) and virtual reality (VR): Augmented reality is an interactive experience in which contextual information, or real-world objects, are added or superimposed onto a user's surroundings in real time. Virtual reality, on the other hand, is a simulation of a three-dimensional environment that can be interacted with using special equipment, such as VR glasses.

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Driving real change and business benefits, fast

Today's CFOs and COOs are about to bear witness to a major rethinking of age-old business processes and strategies. Within just five short years, 83% of respondents agree that the financial close will be completely automated via AI; 78% agree blockchain will reduce fraud by at least half; 77% believe most financial approvals will be automated; and 74% agree intelligent automation will be critical to keep pace with rapidly shifting regulations.

Finance and operations 2.0: The anticipated impact of new technologies

We asked respondents to rate their level of agreement with each of the following statements:

83%

At some point within the next five years, our financial close process will be **completely automated through the use of AI.**

Strongly agree/agree

78%

The ability to verify supply chain monitoring with blockchain will **reduce incidents of fraud in our supply chain by half or more** over the next 5 years.

Strongly agree/agree

77%

I expect that the majority of financial approvals that occur at my organization will be **completely automated within the next 5 years.**

Strongly agree/agree

74%

With the rapidly changing global regulatory environment, there would be no way for my organization to keep up with its financial reporting obligations **without the extensive use of intelligent automation.**

Strongly agree/agree

(Percent of respondents, N=700)

> Our research indicates organizations using emerging technologies report numerous, material benefits.

Many executives are eagerly embracing this dawning of a new era by exploring new use cases, upskilling employees, and driving adoption among workers. But emerging technologies need to be taken out of the sandbox and put into use in order for them to have a lasting and positive impact on finance and operations, and to make these expectations reality.

Our research indicates organizations using emerging technologies report numerous, material benefits; their finance and operations teams tend to outperform those that are not embracing more innovative solutions. But does the correlation hold when looking at the macro-performance of organizations? In short, yes.

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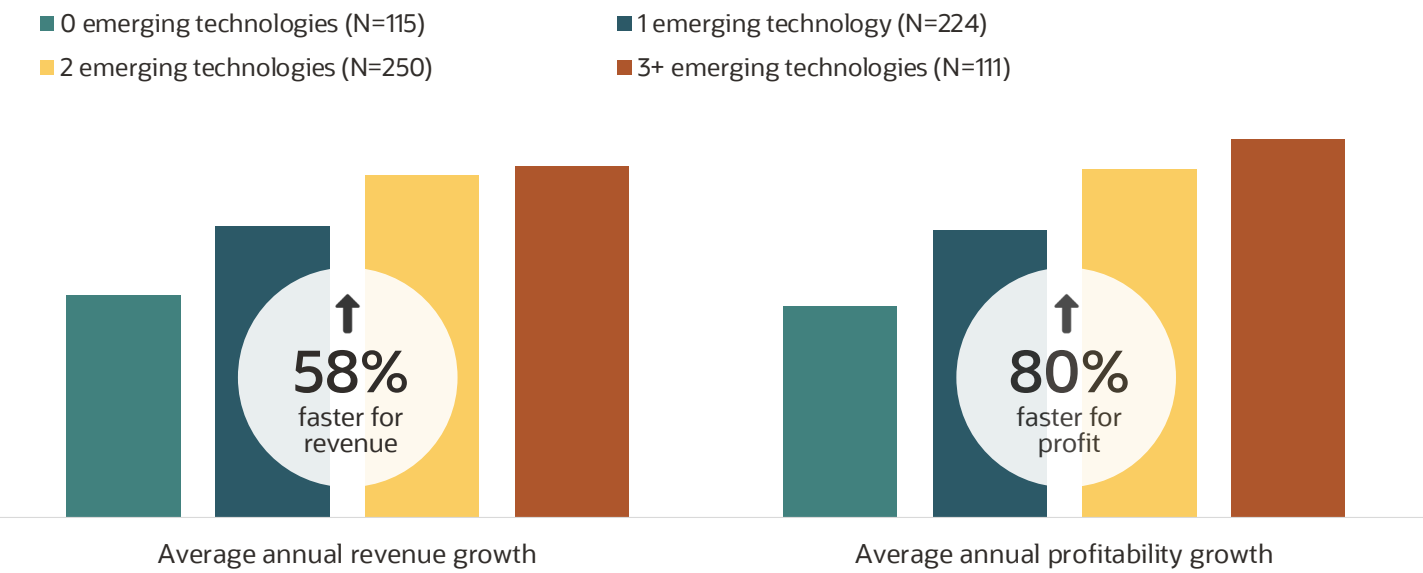
In the survey, respondents were asked about their organizations' overall business performance. Whether it be revenue growth, profitability, market share, or innovation, aggressive adopters of emerging technology for finance and operations tend to outperform their peers. When asked about their company's revenue growth over the preceding three years, organizations using three or more emerging technologies reported growing revenue 58% faster than non-users, on average, and also reported growing profitability 80% faster.

Whether it be revenue growth, profitability, market share, or innovation, aggressive adopters of emerging technology for finance and operations tend to outperform their peers.

The more tools in use, the greater the growth



Question text: Over the past 36 months, which of the following best represents your company's typical annual revenue growth (or decline)? Annual net income growth (or decline)?

How are these organizations outpacing the competition in terms of financial performance? The data shows they tend to do a better job out-innovating their counterparts, helping grow market share. We asked respondents to describe how quickly they can bring new products and services to market: 82% of those organizations using three or more emerging technologies reported they are usually or often ahead of competitors, versus 45% of organizations using none.

By freeing up staff from remedial tasks, increasing organizational intelligence with more accurate forecasts, and implementing new business models, adopters of emerging technology better anticipate and react to market demands. The agility, in turn, drives market share growth. The majority of organizations using three or more emerging technologies report having grown their market share over the past three years significantly more than organizations not using emerging technologies.

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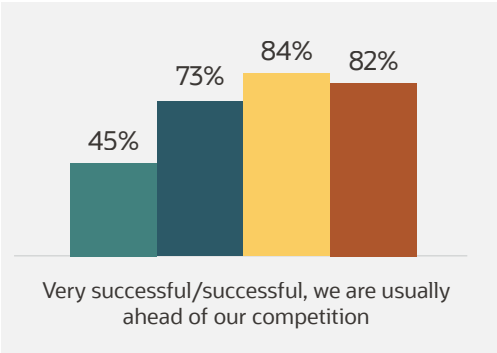
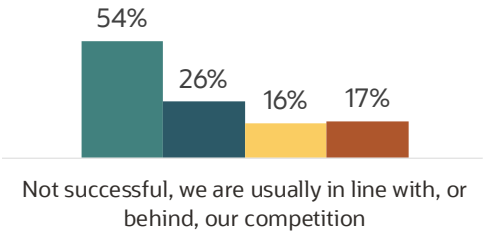
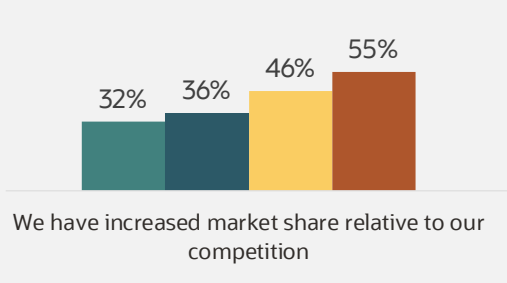
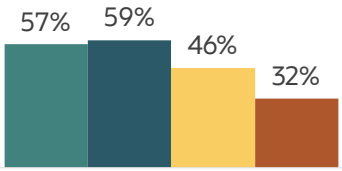
Emerging technologies spur innovation and market share growth

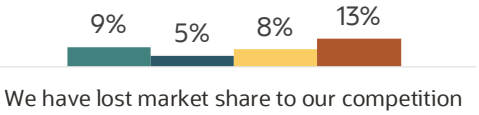




Question text: How would you characterize your company's timeliness at developing and launching new products and services, relative to its competition? (Percent of respondents)







Question text: Over the past 36 months, which statement is the most true? (Percent of respondents)

SaaS eases emerging technology adoption

Clearly, emerging technologies can have a major impact on business outcomes. But legacy applications can stand in the way of reaping real benefits. Highly customized, maintained on-premises, siloed, and often requiring multiyear deployments to get right, they simply lack the agility, speed, interoperability, and simplicity required to tap into the business benefits of technologies such as AI and IoT. For this reason, an increasing number of organizations are turning to SaaS consumption models to more easily "turn on" prebuilt emerging technology modules. In fact, 91% of all respondents say SaaS is an enabler of emerging technology adoption within finance and operations applications.

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How Emerging Technologies Can Redefine Legacy Finance Applications

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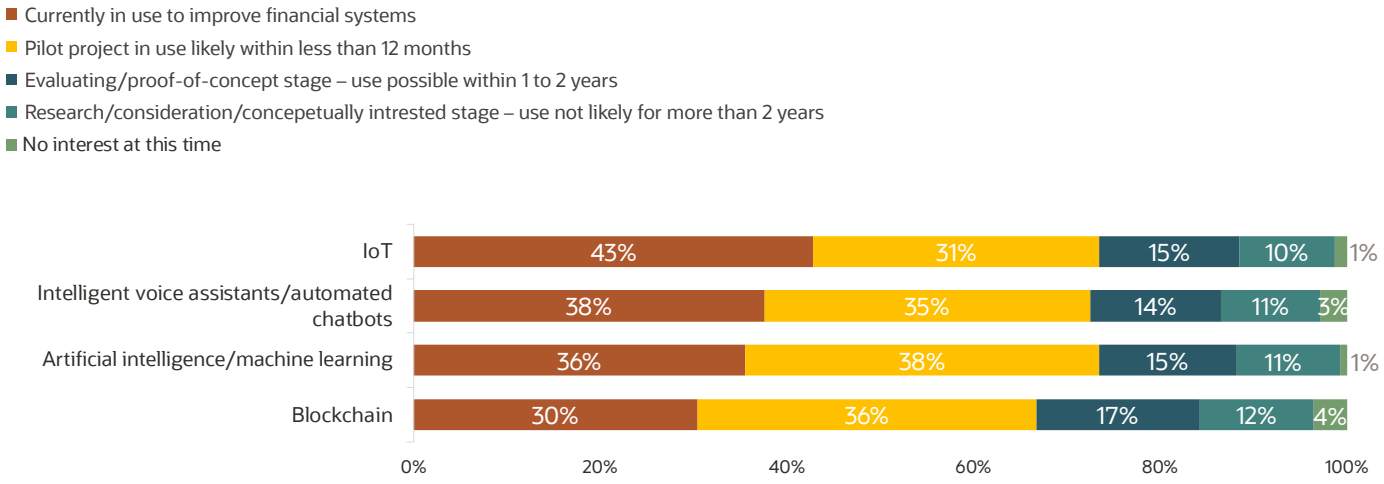
How Emerging Technologies Can Redefine Legacy Finance Applications

Two key systems have long served as the backbone of the finance function: ERP and EPM. Together, these solutions allow teams to manage day-to-day business activities such as accounting, procurement, project management, risk management and compliance, forecasting, workforce planning, and financial report creation.

These finance systems are designed to ingest, organize, and present all of an organization's business data, within a common database. But organizations are looking for more than data reporting from their finance teams. Organizations want the finance function, and the systems that they use, to be predictive, insightful, and a source of competitive differentiation. This requires a major shift in both mindset and capabilities for most finance teams. At the same time, the variety and velocity of data within organizations are growing and accelerating, with legacy finance solutions unable to keep pace. Organizations are looking to add emerging technologies to their financial systems to help overcome these parallel challenges.

Broad adoption of emerging technologies to enhance financial applications



Question text: To what extent is your organization using, evaluating, or interested in each of the following technologies as new ways to improve your financial systems, processes, and workflows? (Percent of respondents, N=532)

This report discusses a broad spectrum of topics related to the use of emerging technologies to enhance finance systems. The good news is organizations are seeing a very real payoff. Our survey findings indicate a number of ways emerging technologies, especially when enabled by SaaS, are driving business benefit.

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Top emerging technology statistics:

Finance

Offload to the cloud:

92%

SaaS enablement:

92% of respondents see **SaaS finance applications** as enablers for the adoption of emerging technologies.

2:1

Prebuilt capabilities:

Organizations that add emerging technology capabilities to finance applications by **purchasing prebuilt solutions outnumber those that build solutions by two to one.**

Take advantage of emerging technology benefits:

37%

AI effectiveness:

Users of AI within financial systems report an average improvement of **33% in productivity and 37% reduction in errors.**

4 DAYS

AI efficiency:

Organizations have **reduced the time needed to complete the monthly financial close process by about four days on average** thanks to the incorporation of AI into their finance systems.

88%

IoT ROI:

88% of organizations leveraging IoT data in their financial systems are **achieving or exceeding ROI expectations.**

83%

Blockchain ROI:

83% of organizations leveraging **blockchain technology within finance applications** expect a significant return within one year.

38%

Digital assistant efficiency:

Users of digital assistants within financial systems report an average improvement of **36% in productivity and 38% faster analysis capabilities.**

Optimize finance team performance:

9.5x

Market-leading accuracy:

Emerging technology users are 9.5x more likely than those not using emerging technologies to have **market-leading financial/operational metric accuracy** (38% versus 4%).

Achieve superior business outcomes:

58%

Grow revenue:

Aggressive adopters of emerging technologies for finance and operations have **grown their annual revenues 58% faster** than organizations not investing in any of these technologies.

80%

Grow profit:

Aggressive adopters of emerging technologies for finance and operations have **grown their annual profit 80% faster** than organizations not investing in any of these technologies.

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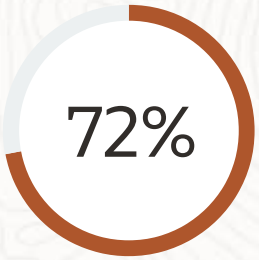
AI: Intelligent processes and fast analysis

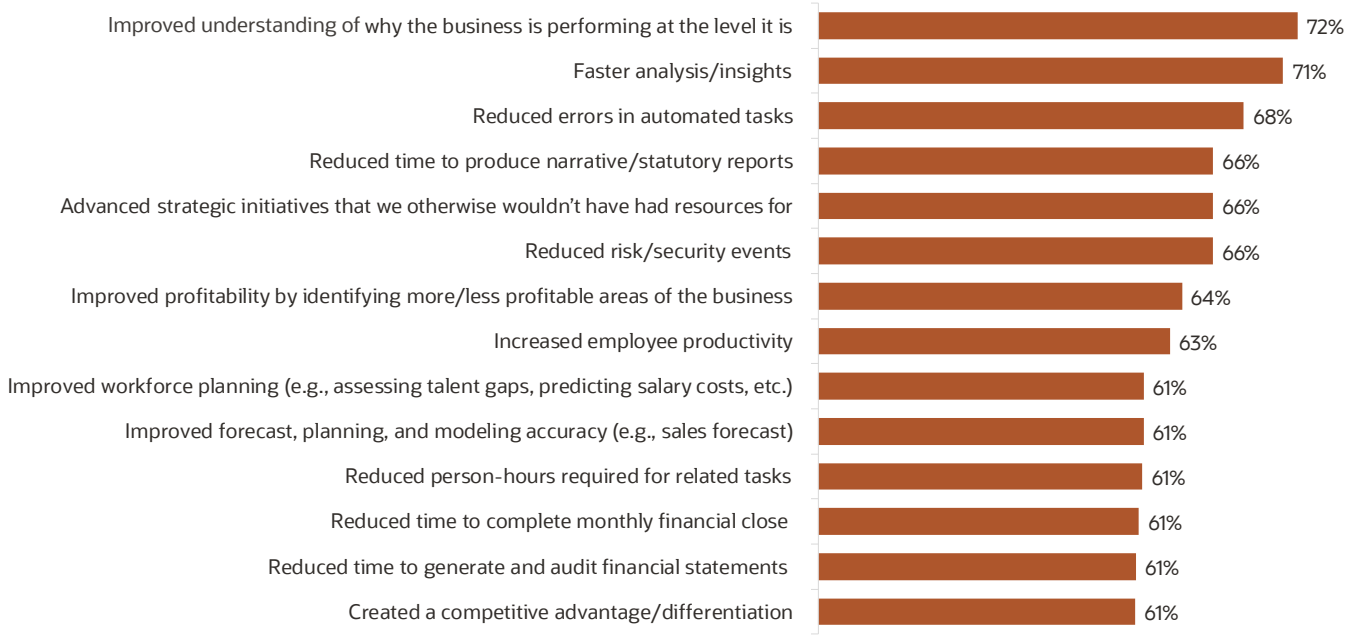
Once fodder for sci-fi novels, AI now delivers enormous business value by using machines to simulate human intelligence and automate rote tasks. As advances in AI and machine learning accelerate, so too do the real-world applications of this technology. In fact, according to PwC, AI could contribute up to $15.7 trillion to the global economy in 2030—more than the current output of China and India combined.



of respondents at organizations using AI within their finance applications **have a better understanding of overall business performance.**

Among the more compelling applications of AI is its ability to enhance finance tasks. Indeed, 72% of respondents at organizations using AI within their finance applications have a better understanding of overall business performance. That's because AI has the ability to quickly and automatically correlate and analyze data from across the organization, providing leaders with a more comprehensive view of what's going on in other business units.

AI is delivering benefits to finance teams at scale



Question text: Has your organization achieved any of the following benefits as a result of its efforts to enhance finance tasks with AI?
(Percent of respondents reporting benefit achieved N=391/197, depending on benefit)

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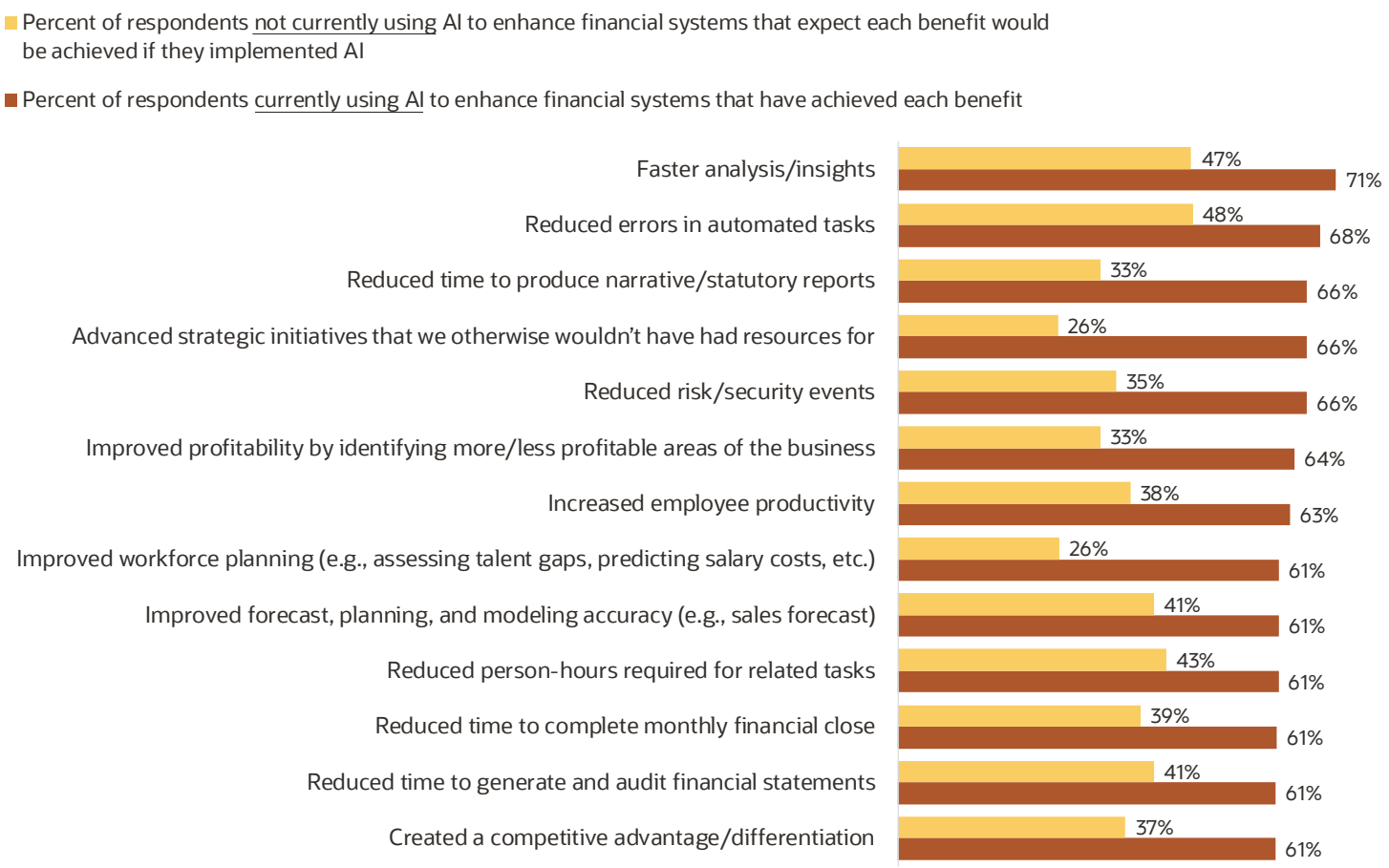
71% of respondents credit AI with delivering faster analysis: data-driven insights that allow fast response to market fluctuations and emerging customer demands. And 68% of respondents emphasize AI's ability to reduce errors by automating tasks, such as filling in expense reports and transaction processing. Another 66% of respondents are encouraged by AI's ability to reduce the time it takes to produce statutory reports. These capabilities free up CFOs to play a more significant role in influencing the strategic direction of the business.

As the regulatory climate intensifies, reporting and monitoring have become much more important to organizations. AI can streamline financial close and compliance processes, helping organizations report with greater confidence. Leaders are also taking note of AI's power to tackle the impossible. Case in point: 66% of respondents believe AI-enhanced finance activities have helped them identify strategic initiatives, like growth opportunities, that might have been overlooked due to limited resources.

The benefits of AI are even more extensive than our survey respondents expected. Among those respondents not using AI, less than half predicted that AI would provide faster insights, higher employee productivity, etc. Yet among companies that have adopted AI, a significantly higher percentage say that they have, in fact, realized such benefits. Organizations would be well-served by aggressively evaluating use cases for their organizations and reassessing their AI-led benefit projections.

> "We have set up a process now within our ERP system so that invoices are automatically approved and go right into our accounts payable system. This saved us two full time positions and the sophistication of the automation also reduces the number of errors we see."
>
> - Senior director of operations and supply chain of a $30B industrial and electronics manufacturer

Incidence of achieving AI benefit versus incidence of expecting AI benefit



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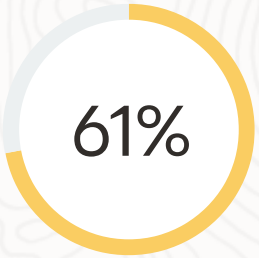

report that AI has reduced the number of person-hours needed to complete tasks—by an average of **60.75 hours per week.**

Most importantly, many of AI's benefits are quantifiable. As seen in the previous chart, 68% of AI users say the technology is helping reduce errors. In fact, they estimate that errors have been reduced by 37% on average thanks to AI. Three-fifths (61%) report that AI has reduced the number of person-hours needed to complete tasks—by an average of 60.75 hours per week.

Error elimination and automation create efficiencies that organizations are using to speed up their financial close and business reporting. By incorporating AI into financial systems, more than half (51%) of respondents have reduced the time it takes to complete the monthly financial close process by three to five days; most organizations (52%) have shortened the time needed to generate and audit financial statements by about four days; and 65% have reduced the time needed to produce statutory reports by one to two weeks. AI is also helping organizations improve forecast accuracy by an average of 32%.

By completing manual reporting tasks more efficiently, AI is freeing up human capital to focus on gleaning better insights from data. Finance teams are spending more of their time understanding the business, spotting anomalies, and identifying trends. These tangible results help business leaders build a solid business case for greater investment in AI.

Typical AI impact

Accelerated monthly close by

3-5 DAYS

Time needed to generate financial statements reduced by

~4 DAYS

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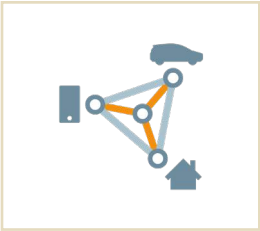


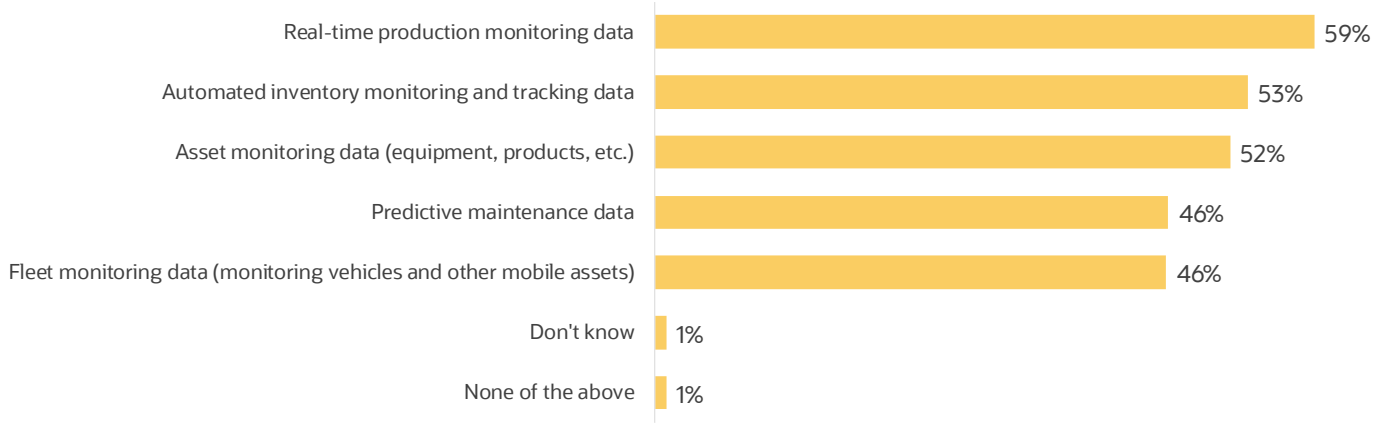
IoT: An engine for efficiency and savings

The world is becoming an increasingly connected place. According to Statista, the number of IoT connected devices is expected to reach 31 billion this year, and grow to 75 billion worldwide by 2025. From beacons to sensors, these "smart" devices collect, send, and act on data by talking to one another in ways that allow organizations to gather real-time insights.

Although IoT resides in the world of operations, its impact is drawing the attention of CFOs, many of whom are interested in converting the vast volumes of data generated by IoT devices into real business value. This is evident in the nearly half (43%) of respondents who are currently feeding connected device data into financial systems, with the most popular use case being the use of real-time production monitoring data. Respondents are also looking to automated inventory monitoring and tracking data (53%), and asset monitoring data (52%) to bolster finance systems.

The benefit for finance organizations is clear: With more accurate and real-time IoT data, finance teams can remove guesswork from forecasts, lower inventory carrying costs, and more precisely budget capital investments guided by asset management data.

IoT data sources ripe for finance systems



Question text: Is your company using (or considering use of) IoT information (i.e., connected devices and the sensor data they produce) from any of the following sources to feed its financial systems, processes, and workflows? (Percent of respondents, N=502)

> "We are using IoT data from production lines to more proactively manage energy use at our factories. With better intelligence we have reduced electricity costs at plants by an average of 15%."
>
> - Business transformation director of a 115,000-employee CPG manufacturer

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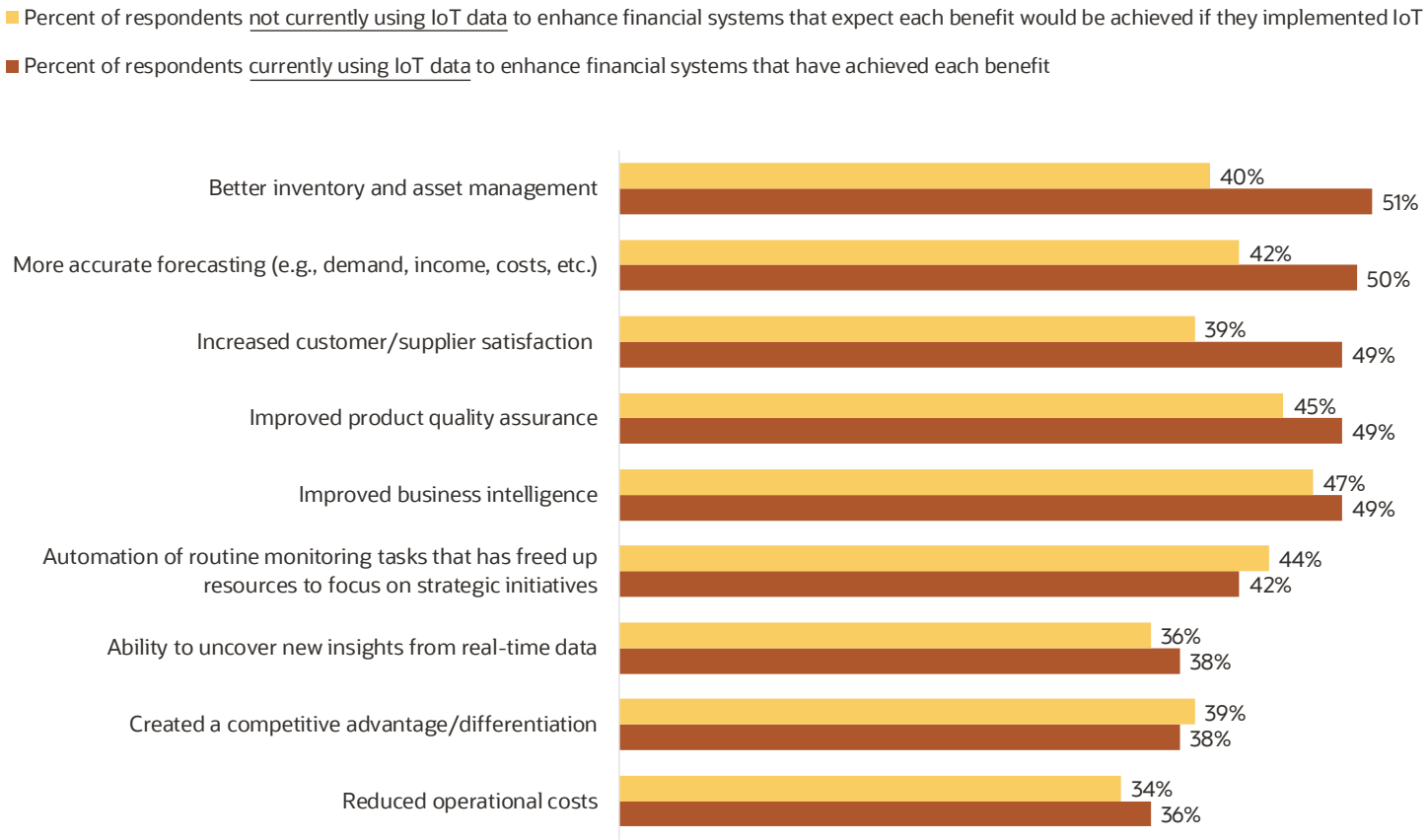
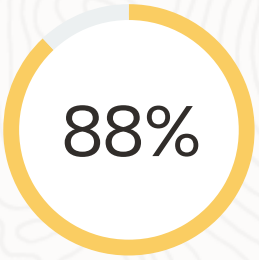
While augmenting financial systems with IoT data is still new, early adopters are achieving more benefits than non-users expect. For example, the majority of IoT users have achieved better inventory management with IoT data—a feat less than half (40%) of non-users believed possible. But unlike AI-powered finance systems, the actual benefits of IoT have yet to far outpace expectations. Case in point: 44% of IoT non-users expected to automate routine monitoring tasks; among users, only 42% report achieving this benefit. Clearly, there is more work to be done to maximize the value of marrying IoT data to financial systems.

Actual IoT benefits surpass expectations



However, a staggering 88% of organizations leveraging IoT data in their finance systems are achieving or exceeding ROI expectations from their investments in IoT data, and 78% have reaped or expect to reap significant business value from their efforts within one year.



of organizations leveraging IoT data in their finance systems **are achieving or exceeding ROI expectations from their investments.**

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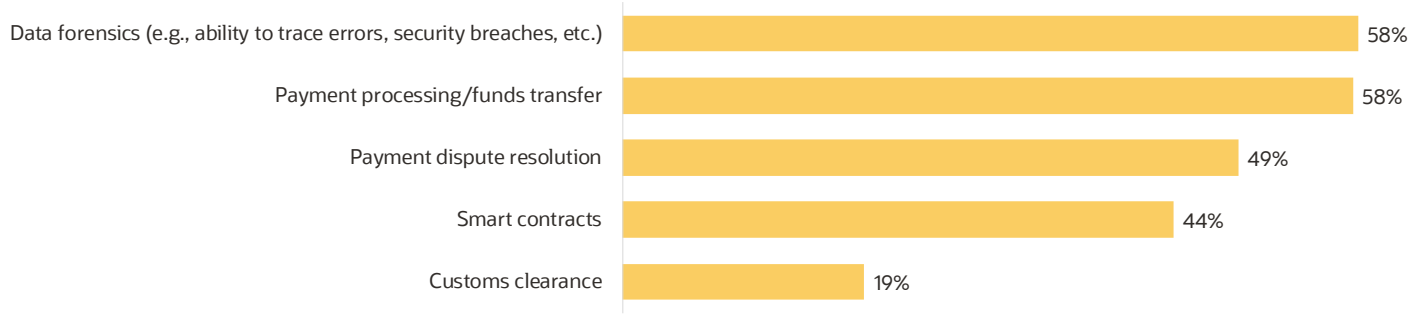
Blockchain: The building blocks for greater trust, compliance, and transparency

Although primarily associated with cryptocurrencies like Bitcoin, organizations are discovering new and exciting use cases for blockchain technology. In fact, Statista values the global blockchain technology market at $1.4 billion in 2020.

A portion of that market will go toward infusing finance systems with blockchain capabilities. In fact, 30% of respondents said their organizations are using blockchain to enhance financial system processes and workflows today, with another 36% reporting a pilot project underway. More than half of these organizations (58%) are exploring blockchain-enabled finance systems for data forensics. With its unalterable blocks and secure record-keeping capabilities, blockchain can offer a valuable and trustworthy forensic trail if quality issues arise after delivery of an item. Healthcare organizations can trace products to identify signs of tampering or careless handling, while grocery stores can identify the source of contamination quickly in the event of a recall. Forensic data is readily available and transparent, eliminating the need to manually sift through paper-based records.

> "We are using blockchain to validate the production and delivery of our most sensitive and expensive cancer treatment. It is manufactured based on the individual patient's T-cells. We are dealing with patients' lives and we have to have absolute certainty that the patient is getting the treatment that was manufactured for them and only them."
>
> - CFO of an 18,000-employee healthcare organization

Where blockchain benefits finance most



Question text: In which of the following ways is your organization using (or considering using) blockchain technology to enhance financial systems, processes, and workflows? (Percent of respondents, N=485)

The transfer of funds is another innovative use case for blockchain. For example, 58% of respondents are evaluating the use of the technology for payment processing. Transferring funds across borders or between banks can be a slow and expensive endeavor. Blockchain technology accelerates this process by serving as a single, trusted data ledger for multiple parties.

One example is Arab Jordan Investment Bank (AJIB), which is using blockchain to expedite cross-border money transfers. This not only eliminates the need for third-party intermediaries, but also promises to help AJIB reduce the cost of processing cross-border payments, increase efficiencies, and improve security.

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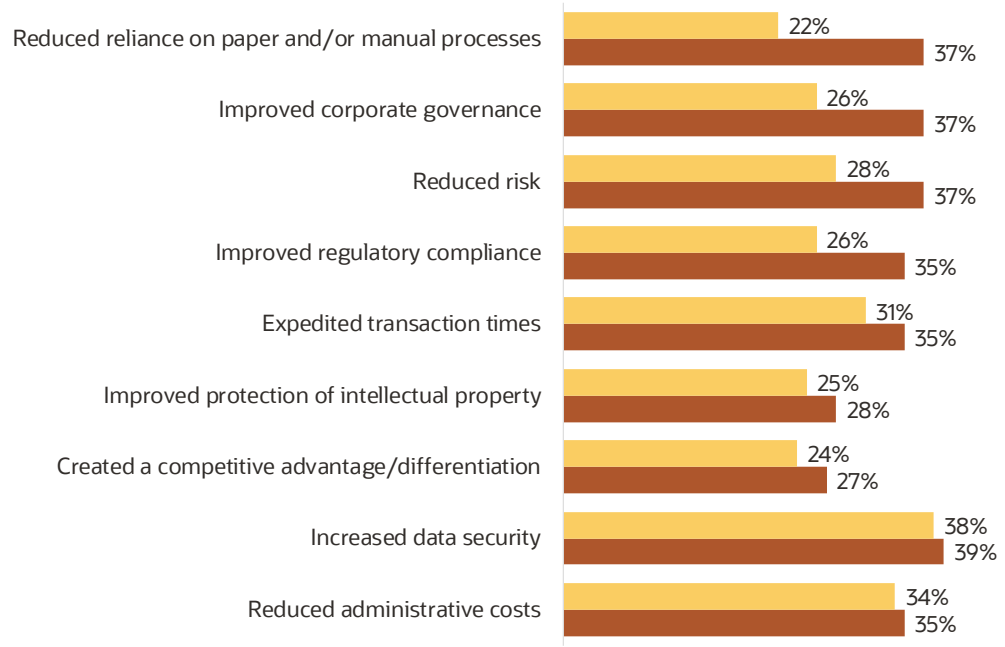
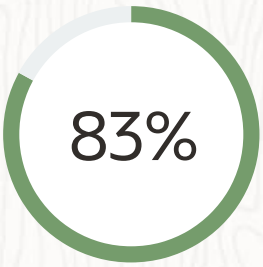
CFOs have the most to gain from blockchain's handling of payment processing. A large part of a finance team's day-to-day activities consists of manually reconciling multiple ledger systems, monitoring transactions, and testing them for veracity. Blockchain can alleviate this burden, allowing teams to focus on more strategic initiatives. With blockchain-enhanced financial systems, every entry is authenticated and confirmed by the technology and can never be altered.

Nearly half (49%) of respondents use blockchain-powered finance systems for payment dispute resolution. Take, for example, SERES. The company, which specializes in secure document exchange, uses blockchain to improve the trust relationship between franchisor and franchisee. For example, if a franchise is experiencing financial difficulties, it may claim that it never received a merchandise delivery from the franchisor. After all, merchandise acceptance processes are typically performed manually, making it easy to dispute transactions. Blockchain changes all that with its concrete traceability capability that outright eliminates the possibility of a dispute.

Organizations using blockchain to enhance finance systems are frequently achieving results, including reduced reliance on paper and manual processes (37%); improved corporate governance (37%); reduced risks (37%); and improved regulatory compliance (35%). In these areas, the impact of blockchain technologies beats the expectation.

Blockchain benefits: Beating expectations





of organizations expect significant value from blockchain utilization within one year.

Blockchain is also improving the reporting and data analysis capabilities of organizations' EPM systems. Advantages include improved regulatory compliance (51%); increased data security (51%); and automation of routine monitoring tasks that have freed up resources, allowing leaders to focus on strategic initiatives (46%).

Blockchain is one of the least understood emerging technologies among executives today, which can hamper investment. The good news is that nearly nine out of ten blockchain users (86% of respondents) report the ROI for blockchain initiatives has met or exceeded their expectations. And 83% of organizations expect significant value from blockchain utilization within one year. It's likely these gains are a result of custom-built solutions and applications based on the limited ecosystem of vendors offering prebuilt applications. Nevertheless, this quick payback can spur even greater investment, perhaps in future prebuilt applications, or at least compel CFOs to educate themselves on its potential business value.

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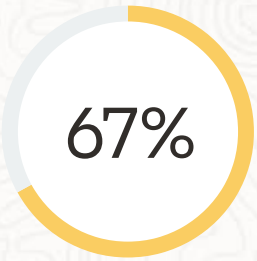
Digital assistants: Delivering an enhanced experience

The chatbot revolution is well underway. Tech titans have unleashed a variety of tools and platforms so that organizations can adopt intelligent enterprise chatbots with a distinctly human touch. Corporations are taking advantage and deploying these digital assistants to automate manual activities, increase business efficiencies, and better engage employees and customers.

As chatbot-to-human interactions become more commonplace, and more refined, employees expect enterprise apps to offer the same easy-to-use experience and advanced interactions.

Finance departments are no exception. Today's CFOs want to spend their limited time and resources on strategic initiatives rather than navigating their financial systems. That's especially true as technologies such as Google Assistant, Apple's Siri, and Amazon's Alexa become the preferred medium for receiving weather updates, ordering take-out, and even booking flights. As these chatbot-to-human interactions become more commonplace, and more refined, employees expect enterprise apps to offer the same easy-to-use experience and advanced interactions. Conversational technologies (such as chatbots, virtual assistants, and digital assistants) offer a solution, promising to reshape the way employees access critical systems and to deliver numerous benefits to organizations.



More than two-thirds (67%) of organizations using digital assistants in finance systems **report achieving increased employee productivity.**

The proof is in the numbers: More than two-thirds (67%) of organizations using digital assistants in finance systems report achieving increased employee productivity. Consider submitting employee expenses—a time-consuming and tedious process that, when delayed, can prevent finance from closing its books. With a digital assistant, an employee can easily open a messaging app and have a conversation with the expense assistant that quickly guides the user through the expense workflow. Once completed, the digital assistant will then automatically deliver this confidential information securely to the appropriate finance systems. Similar efficiencies are achievable in other areas such as purchasing, where a bot can instruct employees to buy from approved suppliers. On average, respondents say workflows enhanced by digital assistants deliver a 36% increase in employee productivity.

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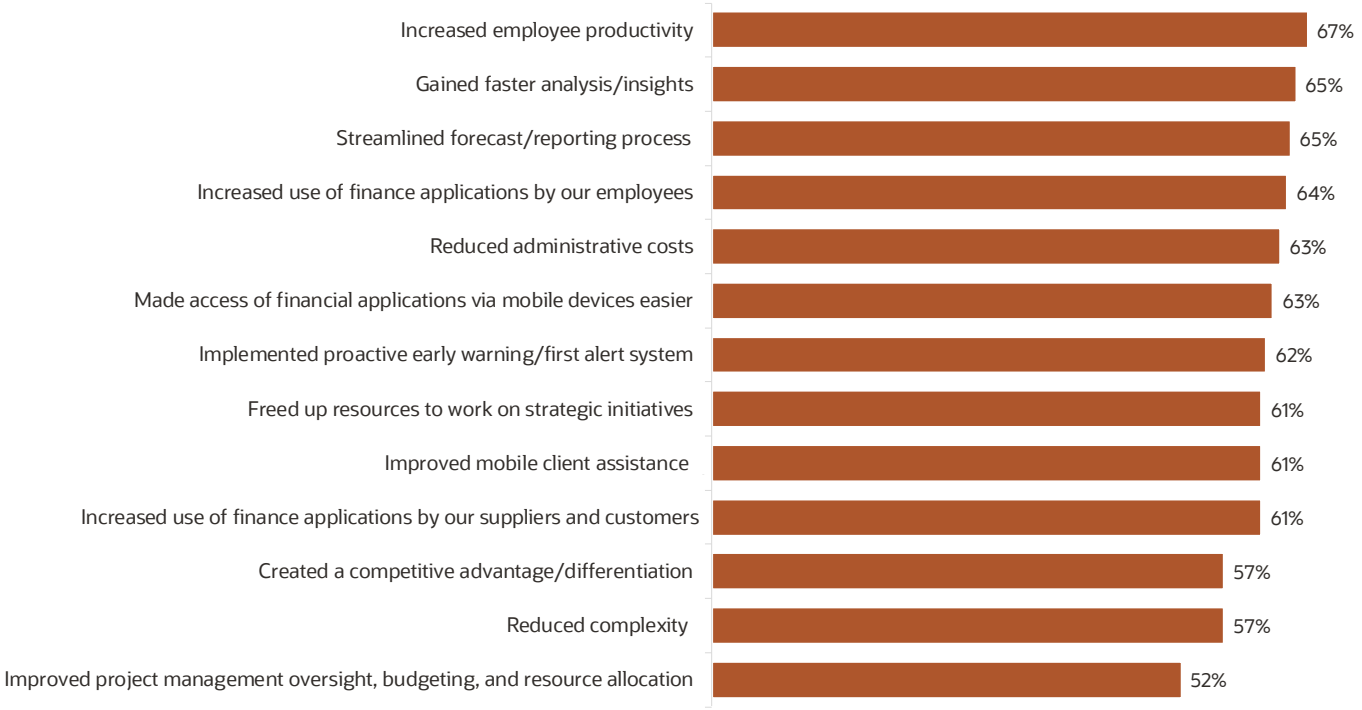
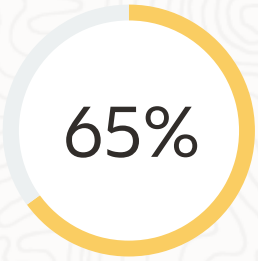
The impact of conversational technology in finance



Question text: Has your organization achieved any of the following benefits by using conversational technologies (such as chatbots and intelligent voice assistants) to provide access to financial systems? (Percent of respondents reporting benefit achieved N=386/184, depending on benefit)

Another advantage of digital assistant-powered finance systems is faster analysis and insights, according to 65% of respondents. When asked to quantify a digital assistant's impact on the speed of analysis, respondents, on average, reported a 38% increase. A perfect example is a CFO with a multinational retail chain. To find answers to critical business questions relating to a recent marketing campaign, the CFO would typically have to send emails back and forth among various marketing executives. Using a digital assistant, the CFO can simply ask, "What's the current margin on our new BOGO offer for trendsetters?" and receive a real-time, accurate response.

Similarly, 65% of respondents say that conversational technologies are helping to streamline forecasting and reporting processes. That's because many digital assistants feature comprehensive dashboards that capture details and provide status updates without having to consolidate spreadsheets and pore over vast volumes of data. For instance, an expense reporting assistant can automatically create, classify, and match expense items for easy processing. At the same time, a powerful voice interface allows a CFO to interact with the digital assistant based on predetermined preferences.



of respondents say that conversational technologies **are helping to streamline forecasting and reporting processes.**

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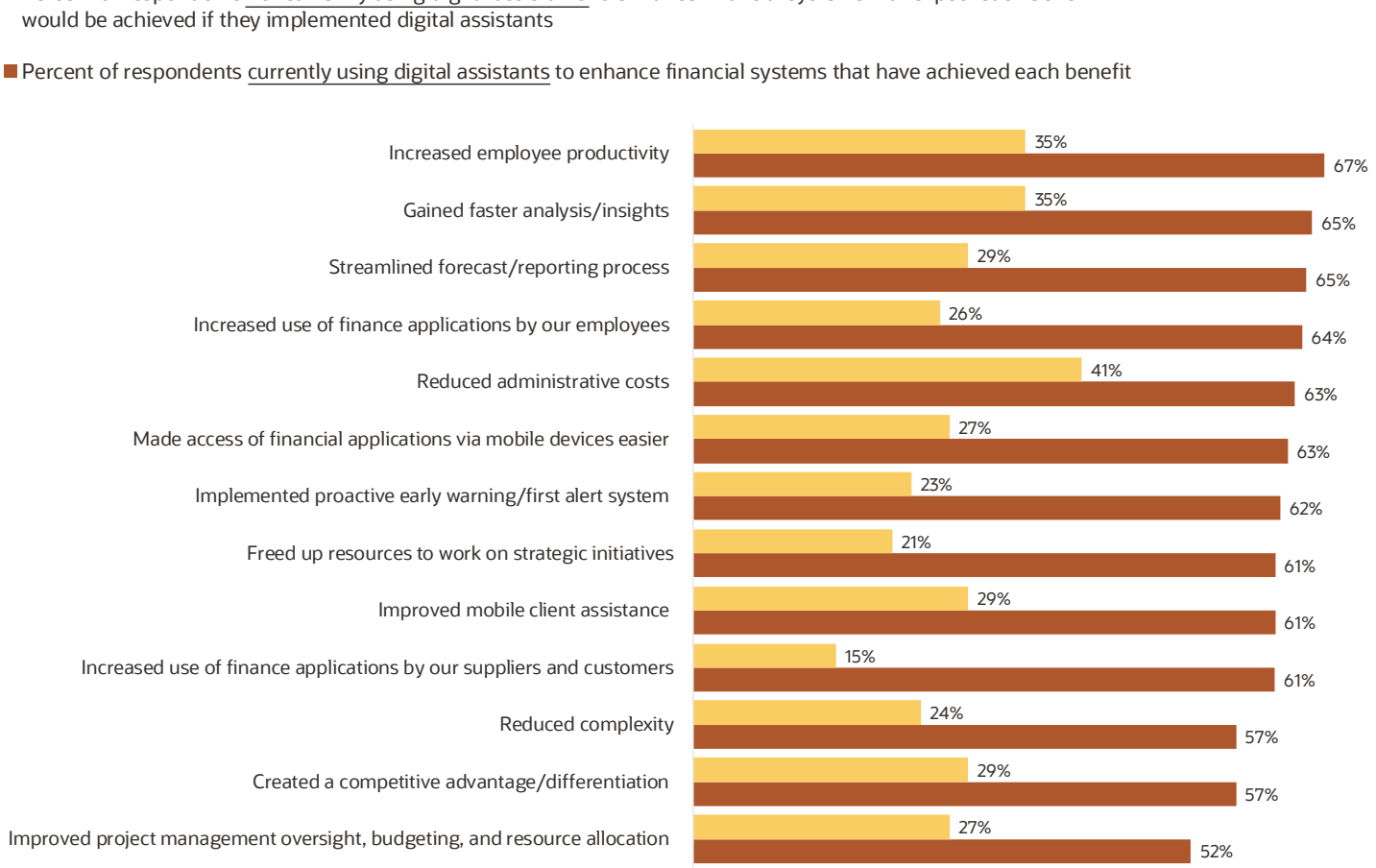
No wonder many organizations are crediting digital assistants with driving greater adoption of finance solutions. In fact, 64% of survey respondents believe the technology is increasing the use of finance applications among employees.

At the same time, 63% of organizations believe digital assistants can help cut administrative costs. A single manufacturer, for example, may have billions of products in the field. If each of these products is protected by a warranty, the manufacturer could easily expect to receive millions of customer queries, ranging from refund requests to troubleshooting questions. The labor costs alone of fielding these queries could be financially crippling. Digital assistants change the playing field, allowing users to engage with an automated conversational interface for faster responses, increased customer satisfaction, and reduced labor costs.

Among all the emerging technologies we examined across the finance function, the benefits of digital assistants are outpacing expectations by the widest margin. The following chart illustrates the gulf between what non-users expect of digital assistants and what users are actually achieving. There is no time to waste when it comes to adding digital assistants to financial workflows. Laggards risk being left behind by their more aggressive counterparts who are placing bigger bets on this technology.

63% of organizations believe digital assistants can help cut administrative costs.

Digital assistant benefits outpace expectations by a wide margin



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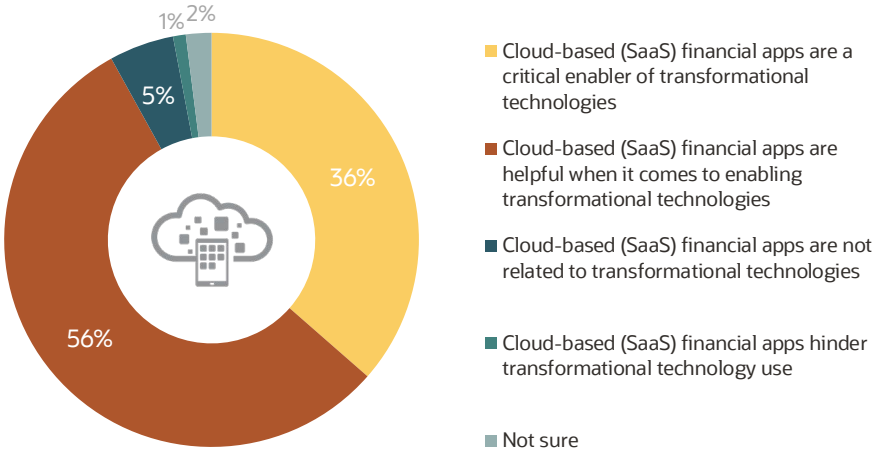
Learning from the leaders: Getting initiatives off the ground

Savvy CFOs are leveraging emerging technologies to reinvent business processes, enhance employee experiences, and drive customer engagement. But putting new technologies to work is not always easy. Years ago, ERP implementations carried seven-figure price tags and required painful multiyear deployments, not to mention scores of high-priced consultants to keep systems up and running.

That was then. Today, cloud-based, SaaS technology provides an ideal architecture for the adoption of emerging technology without the IT headaches. In fact, two clear, interrelated trends emerge from our research related to the cloud consumption model:

First, 92% of respondents see SaaS finance applications as an enabler of emerging technology adoption.

SaaS financial applications are an emerging technology enabler



Question text: What relationship do you see between cloud-based (SaaS) financial applications and the ability to apply emerging technologies to these financial systems, processes, and workflows? (Percent of respondents, N=532)

> "Our IT department likes to build our tools, but I am trying to get them to buy these technologies off the shelf. Companies that have highly-skilled software development practices will always deliver better solutions than what we can deliver."
>
> - CFO of a $20B food services and hospitality company

This opinion is supported by actual adoption of emerging technologies. The data shows a clear correlation between an organization's use of SaaS financial applications and its deployment of emerging technologies. Among organizations using three or more emerging technologies today to enhance financial systems, 62% consume their financial apps via SaaS while just 32% run these apps on-premises.

The second trend is the preference to buy rather than build emerging technologies. Senior leadership may understand the "why" of emerging technologies, but the "how" is often another matter entirely. Many are looking to financial app vendors to offer AI, machine learning, and other advanced capabilities that are built into the software—no assembly required. Our research indicates that organizations are about twice as likely to deploy prebuilt emerging technologies to enhance their financial applications than develop their own solutions. And for good reason: Purchasing emerging technology off the shelf allows organizations to focus on core business strategies, such as recruiting talent and boosting profitability, rather than developing and configuring proprietary software.

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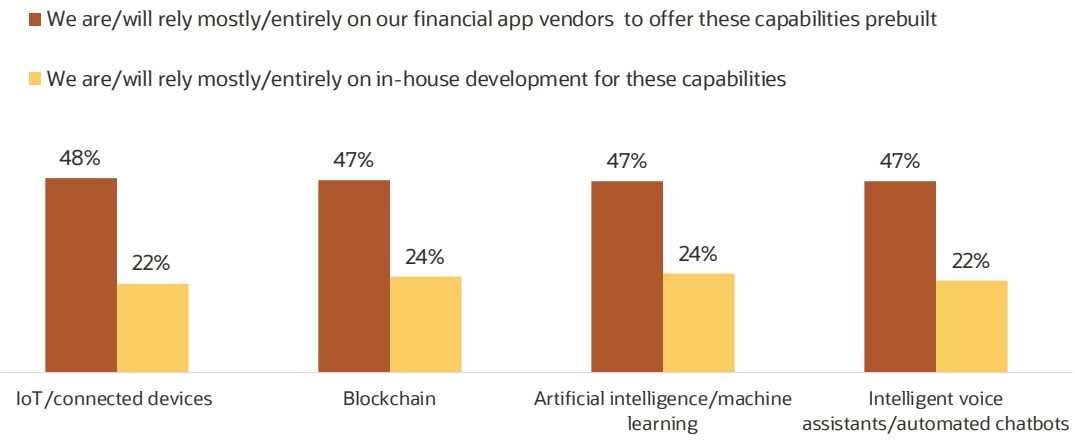
Emerging technology deployments: Buy wins out over build



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preference to buy prebuilt solutions with emerging technology capabilities rather than build them

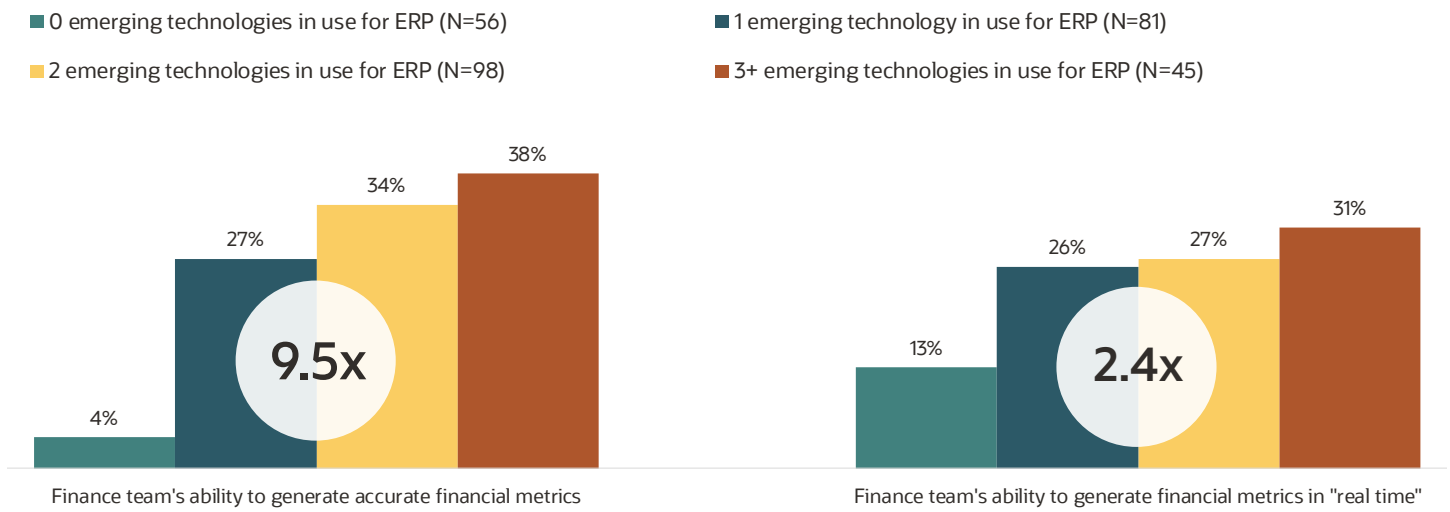
Question text: In which of the following ways is your organization developing and deploying each of the following technologies to improve financial systems, processes, and workflows (or how do you expect it will in the future)? (Percent of respondents, N=532)

At the same time, the importance of strong executive understanding of emerging technologies and their role in finance systems cannot be understated. Organizations with a strong executive understanding of emerging technologies are 3.7x more likely to use AI, 2.6x more likely to use chatbots, and 3.7x more likely to use IoT in production than their less fluent counterparts.

Emerging technologies are key to unlocking market-leading performance

Respondents report emerging technologies are having a profound impact on the efficiency of finance and operations teams. In fact, the more emerging technologies used by a finance team, the more likely an organization is to be market-leading when it comes to generating accurate, real-time metrics. According to our research, organizations using three or more emerging technologies are 9.5x as likely as those using none to view themselves as market leaders (38% versus 4%) when it comes to the accuracy of financial metrics generated. Similarly, users of three or more emerging technologies are 2.4x more likely to be rated as market leaders (31% versus 13%) when it comes to generating financial metrics in real time.

Use of emerging technologies is tied to market-leading financial visibility



Percent of organizations that rate finance capabilities as “market leading”

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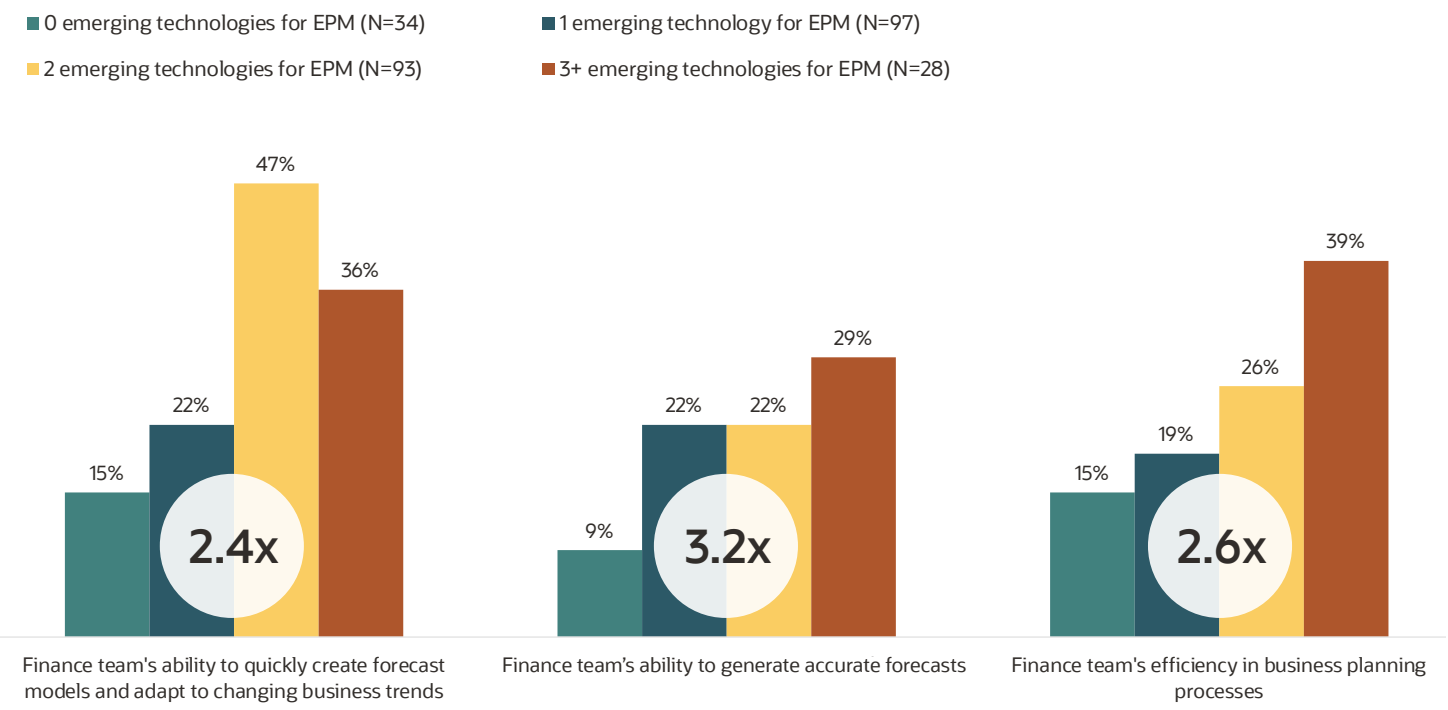
> **We think we can improve our forecast accuracy by 5%-10% with AI's ability to process so much more data, faster, all while learning from it. Today, we're probably about 50%-60% accurate with our three-month forecasts. We expect to add 1 to 2 points to our gross margins by adding AI to the process."**
>
> - Senior director of operations and supply chain of a $30B industrial and electronics manufacturer

The relationship between market-leading performance and emerging technology use carries through to forecast and planning capabilities including greater adaptability to changing business trends, stronger predictive powers, and increased operational efficiencies. According to our research, organizations using three or more emerging technologies are 2.4x more likely than those using none to view themselves as market leaders (36% versus 15%) when it comes to their ability to quickly create forecast models and adapt to changing business trends. Similarly, users of three or more emerging technologies are 3.2x more likely to rate themselves as market leaders (29% versus 9%) when it comes to forecasting financial and operations metrics and 2.6x more likely to rate themselves as market leaders (39% versus 15%) when it comes to budgeting efficiency.

These are more than simply nice-to-have capabilities; in today's fast-paced, highly competitive marketplace, they are competitive differentiators—factors that ultimately separate leaders from laggards.

Use of emerging technologies is tied to market-leading financial planning



Percent of organizations that rate financial planning capabilities as "market leading"

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How Emerging Technologies Can Turbocharge the Supply Chain

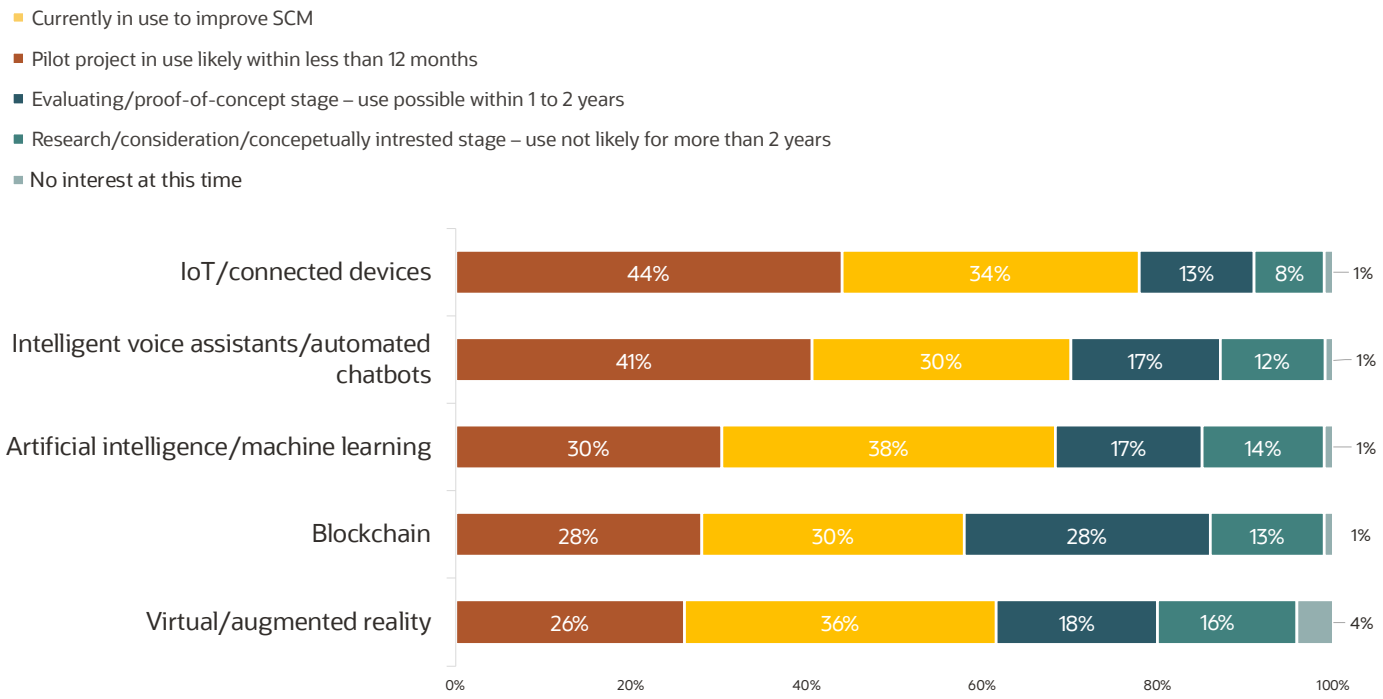
ORACLE | ESG

How Emerging Technologies Can Turbocharge the Supply Chain

From demand planning to logistics, industry leaders have been reaping the benefits of supply chain management (SCM) systems for years now. But times are changing. Product lifecycles are shortening, requiring organizations to consistently introduce new products into the market and phase out old ones. A challenging regulatory environment is raising the bar on product quality and production yield. Increased buyer expectations are calling for end-to-end supply chain visibility. And factors such as globalization, product customization, and proliferating sales channels are increasing the inherent complexity of maintaining an efficient and responsive supply chain operation.

In search of a solution, many companies are looking to emerging technologies en masse. According to our research, between 58% and 78% of surveyed organizations use or are piloting each emerging technology (IoT, digital assistants, AI, blockchain, and VR/AR) to enhance SCM systems/processes.

Wide-spread adoption of emerging technologies to improve SCM



Question text: To what extent is your organization using, evaluating, or interested in each of the following technologies to improve SCM functionality? (Percent of respondents, N=168)

This report discusses a multitude of technologies that can be used to improve supply chain performance. The data clearly shows organizations are successfully redefining supply chain capabilities with emerging technologies, particularly when pairing these technologies with modern cloud-delivered SCM.

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Top emerging technology statistics:

Supply chain management

Offload to the cloud:

88%

SaaS enablement:
88% of respondents see **SaaS SCM applications** as enablers for the adoption of emerging technologies.

3:1

Prebuilt capabilities:
Organizations that add emerging technology capabilities to SCM applications by **purchasing solutions outnumber those that build solutions by three to one.**

Specific impacts by emerging tech:

76%

AI efficiency:
76% of organizations cite increased employee productivity as a **realized benefit of AI-powered SCM.**

75%

Increase adoption:
75% of respondents credit chatbots and intelligent voice assistants with **increasing the use of SCM apps by suppliers and customers.**

6 DAYS

IoT efficiency:
Organizations have shortened their time to produce/fulfill orders by an average of **more than six business days as a result of incorporating IoT data into their supply chain systems and workflows.**

83%

IoT ROI:
88% of organizations using IoT data to support SCM say the **ROI has met or exceeded expectations.**

87%

Blockchain ROI:
87% of organizations adding blockchain to SCM capabilities say the **ROI has met or exceeded expectations.**

78%

Reduce fraud:
78% of respondents agree that the ability to verify supply chain monitoring with blockchain will **reduce incidents of fraud in their supply chain by 50% or more over the next five years.**

Optimize operations team performance:

6.8x

Market-leading accuracy:
Emerging technology users are **6.8x more likely to describe their order-to-cash time as market-leading** than those not using emerging technologies (38% versus 4%).

Achieve superior business outcomes:

58%

Grow revenue:
Aggressive adopters of emerging technologies for finance and operations have **grown their annual revenues 58% faster** than organizations not investing in any of these technologies.

80%

Grow profit:
Aggressive adopters of emerging technologies for finance and operations have **grown their annual profit 80% faster** than organizations not investing in any of these technologies.

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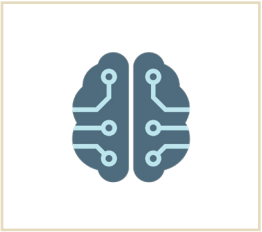


AI: Real-time intelligence for real-world challenges

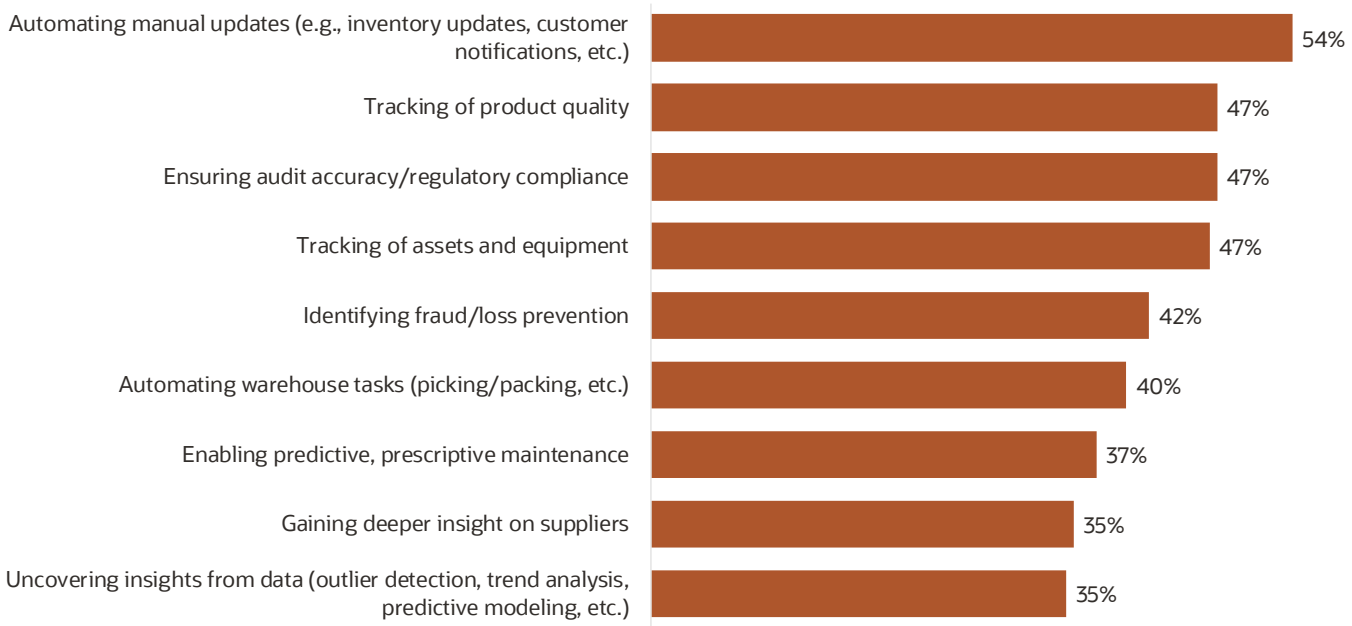
Long gone are traditional supply chains that prevent organizations from gaining visibility into business-critical issues, from real-time inventory levels to potential production delays. Organizations are increasingly using AI to enhance their SCM systems and processes. Some 30% of survey respondents report that their organization already uses AI in production today to enhance supply chain management with an additional 38% saying pilot projects are underway.

> **We are working on using AI to optimize store inventory levels; based on our early results, we think this time next year we will have reduced our inventory costs by 10%-15%."**
>
> - Business transformation director of a 115,000-employee CPG manufacturer

The time is ripe. The supply chain is no longer about just sourcing, manufacturing, distributing, and selling products. Rather, by gaining greater visibility into a supply chain, organizations can make smarter decisions, create more compelling customer experiences, and better prepare for unplanned events.

The majority (54%) of respondents are using AI to automate manual supply chain updates, like customer notifications. Providing customers with real-time updates on expected shipment dates and delays can be a time-consuming process without advanced tools such as order and transportation management applications. Fortunately, automation keeps customers up to date on order statuses in real time, allowing organizations to better serve their customers.

Top supply chain use cases for AI



In which of the following ways is your organization using (or considering) AI to enhance SCM systems, processes, and workflows? (Percent of respondents, N=158)

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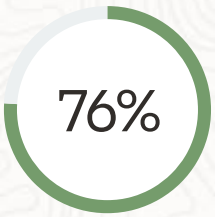
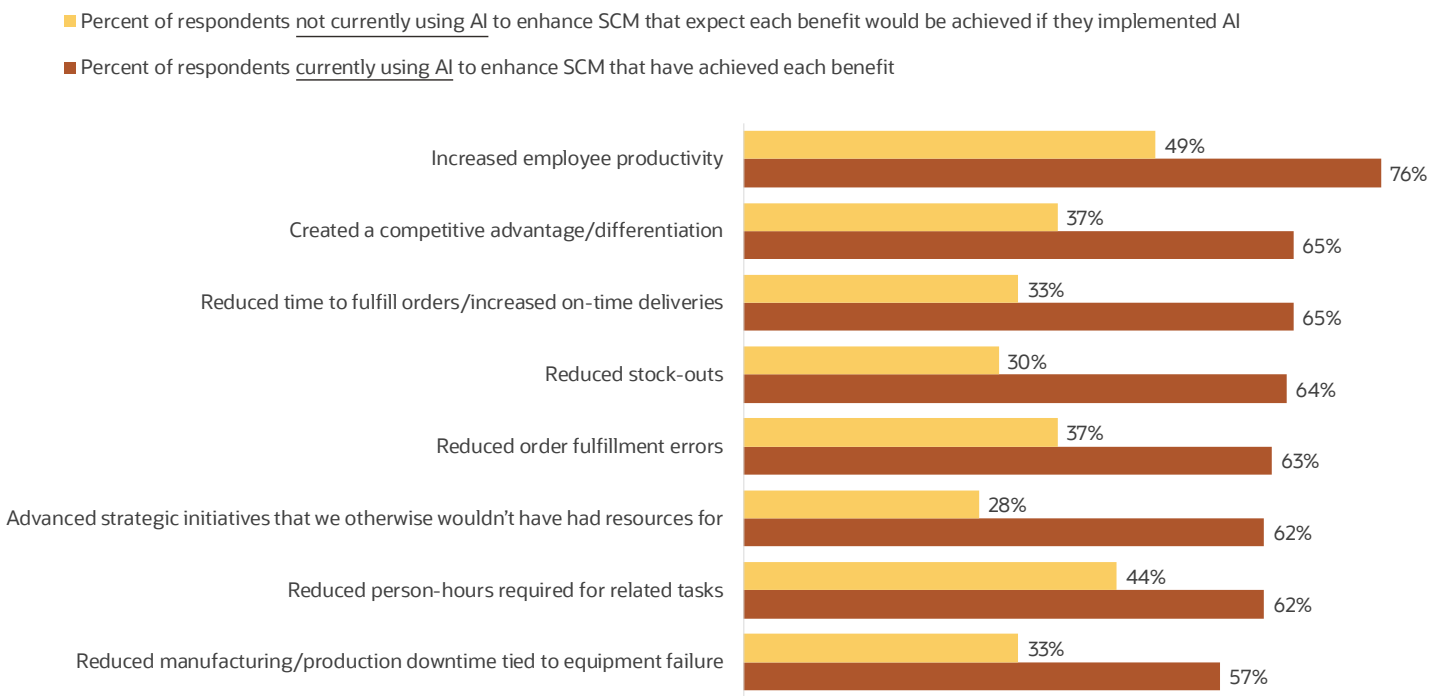
Tracking product quality is another opportunity to improve the supply chain with AI capabilities, according to 47% of respondents. That's because embedded AI helps uncover the "why" behind quality issues, performing root cause analysis and recommending improvements for fast resolution and minimal downtime. Nearly half (47%) of respondents value AI-enabled supply chains for their ability to ensure audit accuracy and regulatory compliance, which are top priorities because non-compliance can easily lead to a tarnished brand, legal liabilities, supply chain disruptions, and severe financial penalties.



of organizations cite **increased employee productivity as a realized benefit of AI-powered SCM.**

More importantly, AI users are already seeing the payoff: 76% of organizations cite increased employee productivity as a realized benefit of AI-powered SCM. Other perks include a competitive advantage (65%), reduced time to fulfill orders (65%), reduced stock-outs (64%), and reduced order fulfillment errors (63%). In these areas, the impact of AI technologies far outpaces expectations.

Actual AI benefits to SCM outstrip expectations



Moreover, benefits are measurable. On average, AI users report a 25% reduction in fulfillment errors, a 30% reduction in stock-outs, and a 26% reduction in manufacturing downtime. Organizations are also able to shorten the time it takes to fulfill orders by an average of 6.7 business days thanks to AI optimization of the supply chain—proof that the technology is a worthwhile investment.

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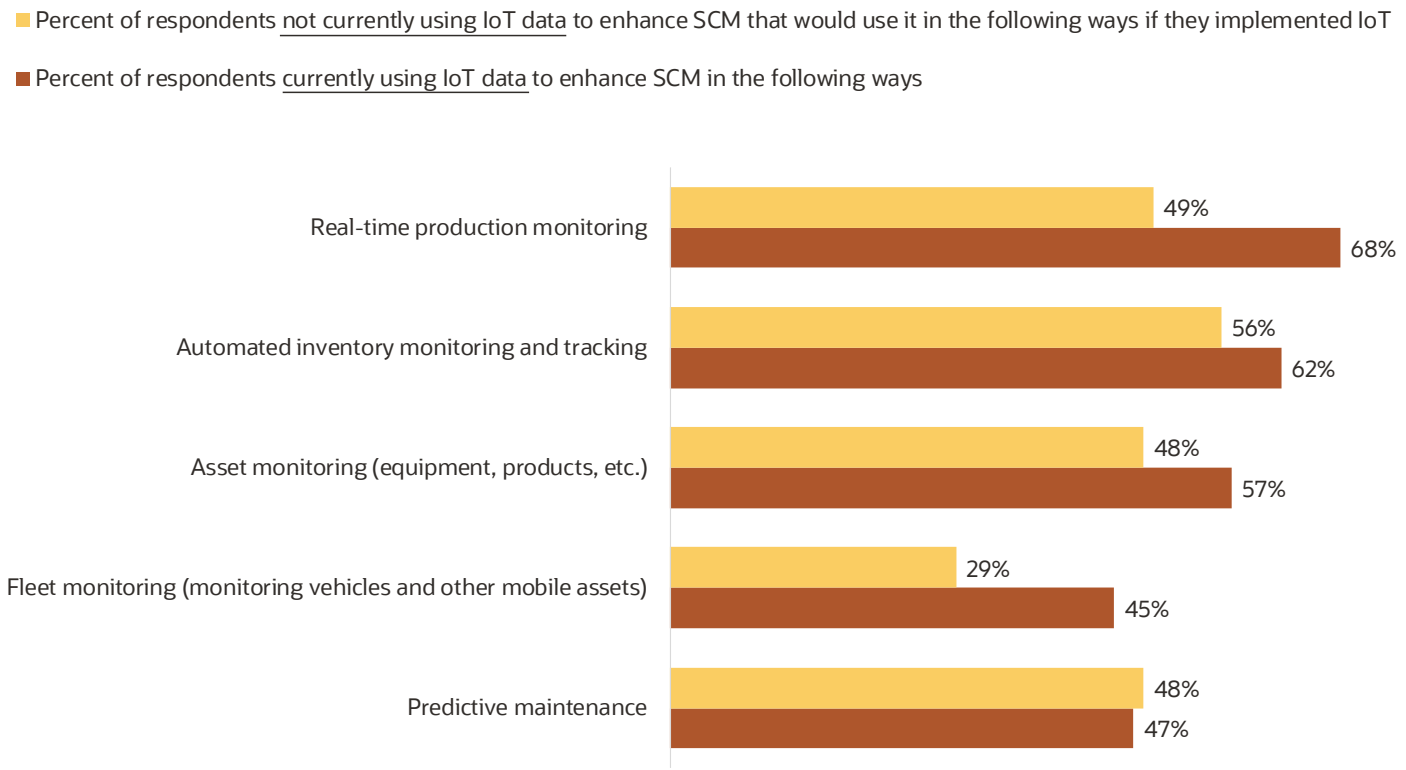
Driving operational health with IOT data and insight

Today's organizations must operate at breakneck speed to adapt to fluctuating consumer demands, market volatility, and nimble competitors. That's not easy given the preponderance of legacy systems, outdated business processes, and supply chains that offer little visibility.

Enter IoT devices and data. By enhancing an SCM application with rich, real-time insights from streaming IoT data, organizations can advance a number of use cases. Chief among these is real-time production monitoring, according to 68% of survey respondents whose organizations currently rely on IoT data.

Where IOT can improve supply chain management



By processing data from the factory floor, production monitoring offers a real-time view of factory operations and production line output. From the health of specific machines to production status, this information can then be used to make decisions that drive supply chain success. For example, continuous monitoring can identify idle or underutilized equipment that, if ramped up, can optimize product output.

Predictive maintenance data is another source of business-critical insights for COOs. Maintaining factory equipment typically involves a predetermined service schedule, and manual processes. Yet a single malfunctioning machine can lead to dire consequences, from lost revenue and profit to the cost of the equipment repair, and even legal liabilities or reputational damage. No wonder 47% of respondents rely on predictive maintenance data for their continued operational wellbeing. By monitoring factory, product, and machine performance using connected machines and manufacturing systems, organizations can achieve the operational visibility required to spot inconsistencies in order to increase equipment uptime and productivity while reducing breakdowns and associated maintenance costs.

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Faulty factory equipment isn't the only threat to business continuity. Nearly half (45%) of respondents view fleet monitoring data as a valuable use case for IoT capabilities. Operations teams depend on fleet performance to get their products where they need to be when customers need them most. The ability to track a vehicle's location, status, and cargo health in real time can significantly contribute to variables such as customer experience, business continuity, and driver safety.

> **"IoT is helping us better match up inventory to sellers, getting product where it needs to be to sell before it has to come off the shelf. We're just scratching the surface, having reduced wastage by about 1%, but already that equates to approximately $5 million per year."**
>
> - CFO of a 1,200-employee prepared foods manufacturer

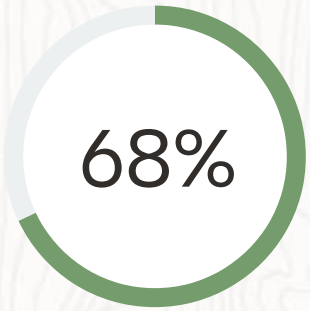
Consider, for example, if a vehicle requires maintenance. Having these details can help prevent problems before they occur and prevent service disruptions due to breakdowns. And because fleet monitoring data can track the location of every vehicle, it's possible to detect whether drivers are complying with company policy, such as adhering to prescribed routes and safe driving practices. Better yet, using fleet monitoring data, organizations can predict vehicle arrival times, providing partners and suppliers with critical real-time information and a better overall customer experience.

Another application of IoT in the supply chain: demand planning. Consider, for example, a bicycle manufacturer that uses anomaly detection for demand planning. By better forecasting changes in consumer demand prompted by changes in the weather or shopping patterns, suppliers can ship goods with greater efficiency.

More than half (62%) of survey respondents view automated inventory monitoring and tracking as an excellent reason to take advantage of IoT data from SCM systems. Take Titan International, for example. The company has been manufacturing wheels and tires for the farming and construction industry for more than 125 years. However, to keep pace with changing customer expectations, the company needed greater visibility into its supply chain. Today, real-time data gleaned from IoT sensors provides Titan with greater insight into its inventory while streamlining processes for its production and shipping teams.

Asset monitoring is another popular IoT use case. By tracking assets using IoT devices and sending real-time tracking data to warehouse management software, organizations can better manage inventory levels, prevent shortages, and reduce the risk of loss from theft or shrinkage. Even more importantly, IoT-derived insights can provide real-time updates on the location of assets along the entire supply chain, alerting managers to unexpected issues. Without these details, organizations run the risk of delivery delays and service failures—events that can significantly impact customer experience.

Organizations are already achieving benefits from using IoT data to enhance SCM systems. More than two-thirds (68%) of respondents cite increased business intelligence as a key advantage. Drilling down into vast volumes of data illuminates ways in which businesses can change and improve their processes for greater profitability. 67% of respondents say using IoT data has reduced fulfillment errors for their organization. That's critical as consumers demand more fulfillment and delivery options than ever before. Meeting these demands requires consolidating data sources to assess inventory levels, predict product fulfillment needs, and identify potential backlog issues within the supply chain.



More than two-thirds (68%) of respondents cite increased business intelligence as a key advantage of IoT implementation.

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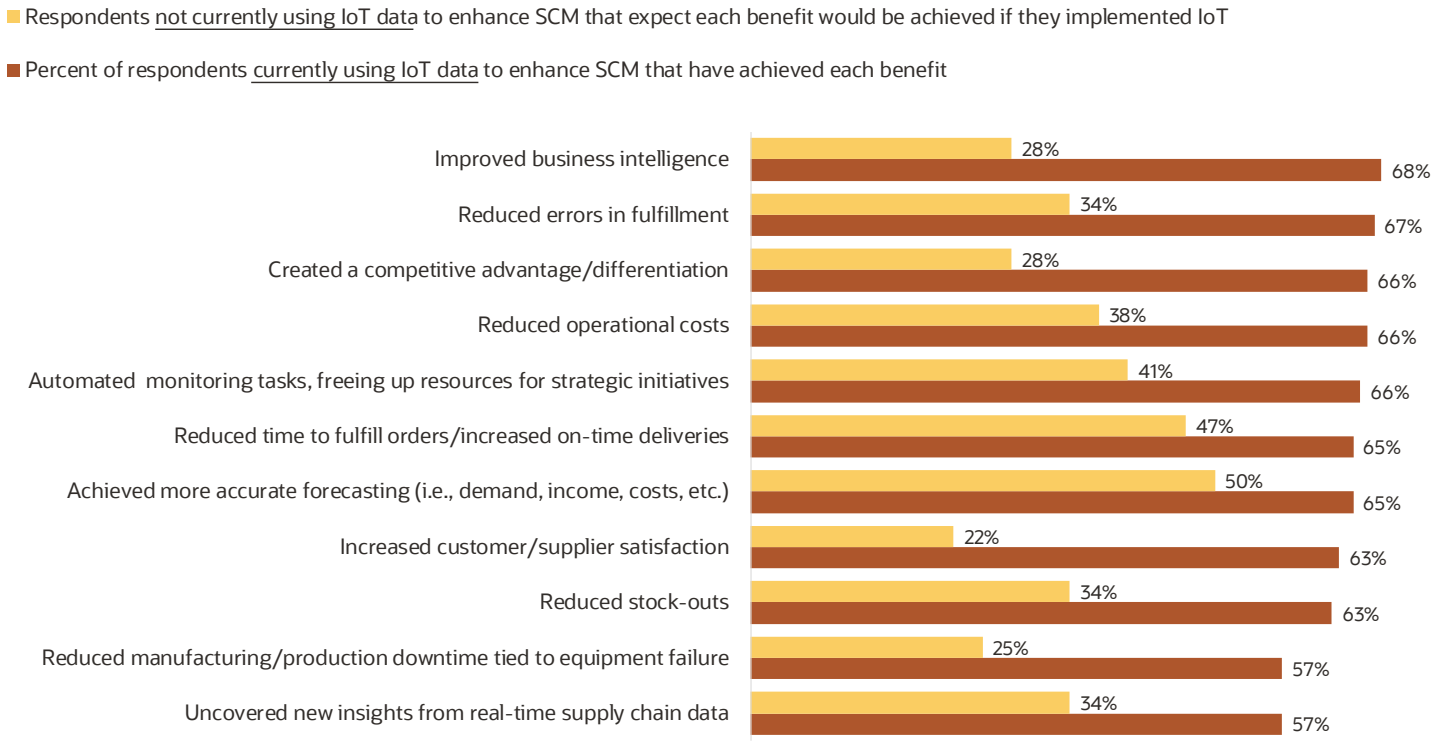
A significant portion of respondents (66%) believe that using IoT data to enhance SCM systems can provide a competitive advantage. The same percentage recognizes a data-rich SCM system's ability to reduce operational costs. Unplanned downtime costs industrial manufacturers an estimated $50 billion each year. However, predictive maintenance and asset monitoring through IoT technology can provide huge cost savings, especially for asset-intensive industries such as mining, oil and gas, energy, and rail. These industries measure output in the billions and trillions of dollars, meaning that even incremental cost reductions in supply chain operations can add up to huge savings. And then there's the automation of routine monitoring tasks, which 66% of respondents regard as a key benefit. Automation is one way to free up precious resources, enabling supply chain executives to focus on strategic initiatives.

As demonstrated by this research, early adopters of emerging technologies reap rewards more often than anticipated.

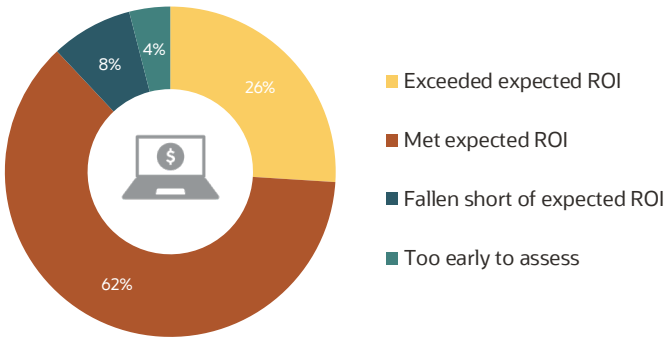
Actual IOT benefits to SCM far outpace expectations



Organizations have already improved critical aspects of their supply chain performance by incorporating IoT information into their SCM systems and processes. Quantifiable achievements include a 26% reduction in fulfillment errors, a 25% reduction in stock-outs, and a 20% reduction in manufacturing and production downtime.

Another strong argument for greater investment in IoT technologies is order fulfillment agility. Order fulfillment is a complex business process that involves careful demand planning, prescient inventory management, strategic supply chain execution, and flawless logistics planning. Yet survey respondents reveal that, on average, IoT data helped shorten time to fulfill orders by 6.1 business days. That's a major accomplishment that might also explain why 88% of production users of IoT data for SCM say ROI has met or exceeded expectations.

Investments in IOT for SCM deliver a strong return



How would you characterize the return on investment (ROI) you've seen or expect to see from your investments to enable the use of IoT information within its SCM systems, processes, and workflows? (Percent of respondents, N=74)

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Blockchain creates trust and efficiency across the supply network

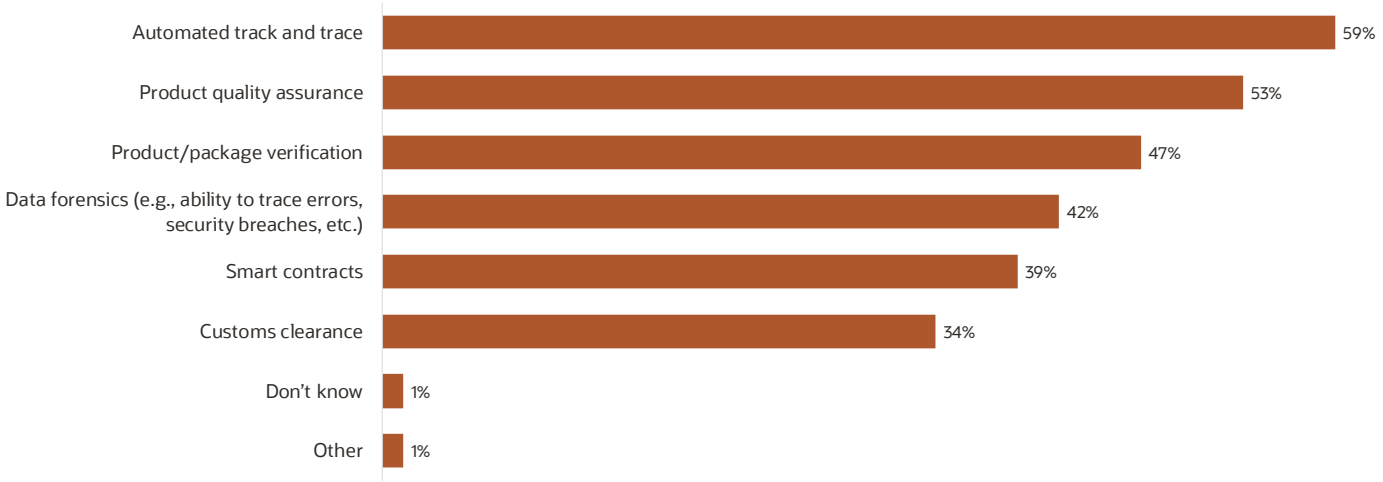
Supply chains produce vast volumes of data, resulting in thousands of daily transactions. Yet it's often difficult to establish trust throughout the network, especially if that network consists of global trading partners. Without trust, there's no way to properly validate data. And without properly validated data, organizations risk exposure to everything from data breaches to non-compliance with stringent regulations.

Blockchain can address these complexities and significantly enhance global supply chains by offering greater transparency and a single source of truth for supply chain network partners. Advantages range from operational efficiencies and dispute resolution capabilities to greater security and trust, all of which are prompting organizations to discover new and innovative use cases. These are likely to involve custom-built blockchain solutions rather than prebuilt apps, which have yet to fully penetrate the market.

Using blockchain to enhance SCM reporting can help automate track and trace, according to 59% of survey respondents. Blockchain offers end-to-end visibility into supply chain networks, enabling asset owners to track and trace items of value to achieve faster results and establish trust among disparate trading partners. Transactions instantly become undisputable, creating a trusted supply chain network. Better yet, any industry can apply blockchain's track and trace capabilities, be it an agricultural co-op focused on ensuring organic certification, or a multinational manufacturer that must adhere to global trade regulations.

Using blockchain to enhance SCM reporting can help automate track and trace, according to 59% of survey respondents.

Use cases for blockchain-enhanced SCM



Question text: In which of the following ways is your organization using (or considering) blockchain to enhance SCM systems, processes, and workflows? (Percent of respondents, N=158)

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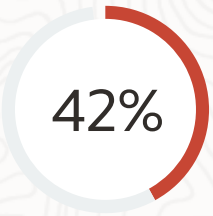
More than half (53%) of respondents use or are considering a blockchain-powered SCM system for product quality assurance. Supply chain anomalies, such as counterfeit merchandise and food contamination, can cripple a company financially. However, blockchain eliminates these issues by automatically verifying the origin and authenticity of a product (using bar codes, RIF tags or NFC tags, or serial numbers) as it moves throughout the value chain.

Blockchain also creates a digital paper trail, detailing a product's pedigree, serialization, and genealogy, establishing an immutable audit trail that's imperative to use cases such as product and package verification (cited by 47% of respondents) and data forensics (42%).

More than one-third (39%) of respondents believe in blockchain's potential to facilitate smart contracts.

More than one-third (39%) of respondents believe in blockchain's potential to facilitate smart contracts. Blockchain allows users to easily define and execute smart contracts, and make additions as required. One advantage is that stipulations can be easily programmed into the contracts. For example, a manufacturer can reward a loyal supplier by programming a contract to release early payment or discount a certain product. Such incentives can contribute to continued product quality and strengthen supply chain partnerships.

CargoSmart provides an example of blockchain in action for SCM. It has simplified shipment documentation processes with the use of a permissioned blockchain: Its platform helps supply chain partners increase document accuracy and traceability, while reducing the time spent handling paper documentation by 65%.



of respondents state that **automating routine monitoring tasks is the most critical advantage.**

Blockchain's proven benefits make a strong business case for investment. Topping the list, 42% of respondents state that automating routine monitoring tasks is the most critical advantage. This is closely followed by increased data security (41% of respondents). After all, supply chains can serve as ideal attack surfaces for ill-intentioned hackers. Six years ago, a major retailer suffered a massive breach in which hackers stole an estimated 40 million credit card numbers. How did cyber attackers accomplish this feat? By first stealing credentials from a third-party heating and ventilation company—proof that an organization's supplier or partner can be the weakest link in a cybersecurity plan. Fortunately, blockchain can provide greater security and trust due to its decentralized nature.

37% of respondents credit the use of blockchain in their SCM system for providing better and/or easier data forensics. That's because blockchain uses cryptography to protect the process of recording and storing transactions, which in turn creates an unalterable audit trail and a higher level of security. Other benefits cited by respondents include reduced reliance on paper and manual processes (35%) and improved regulatory compliance (34%).

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Early adopters have been quick to reap significant rewards from blockchain-powered SCM systems, including a competitive advantage, increased data security, automated routine tasks, expedited transaction time, and reduced fraud and counterfeit goods. These benefits have far exceeded expectations among respondents. Moreover, 87% of current blockchain users surveyed say they have achieved or exceeded their ROI expectations, and 82% expect to see significant business value within the year.

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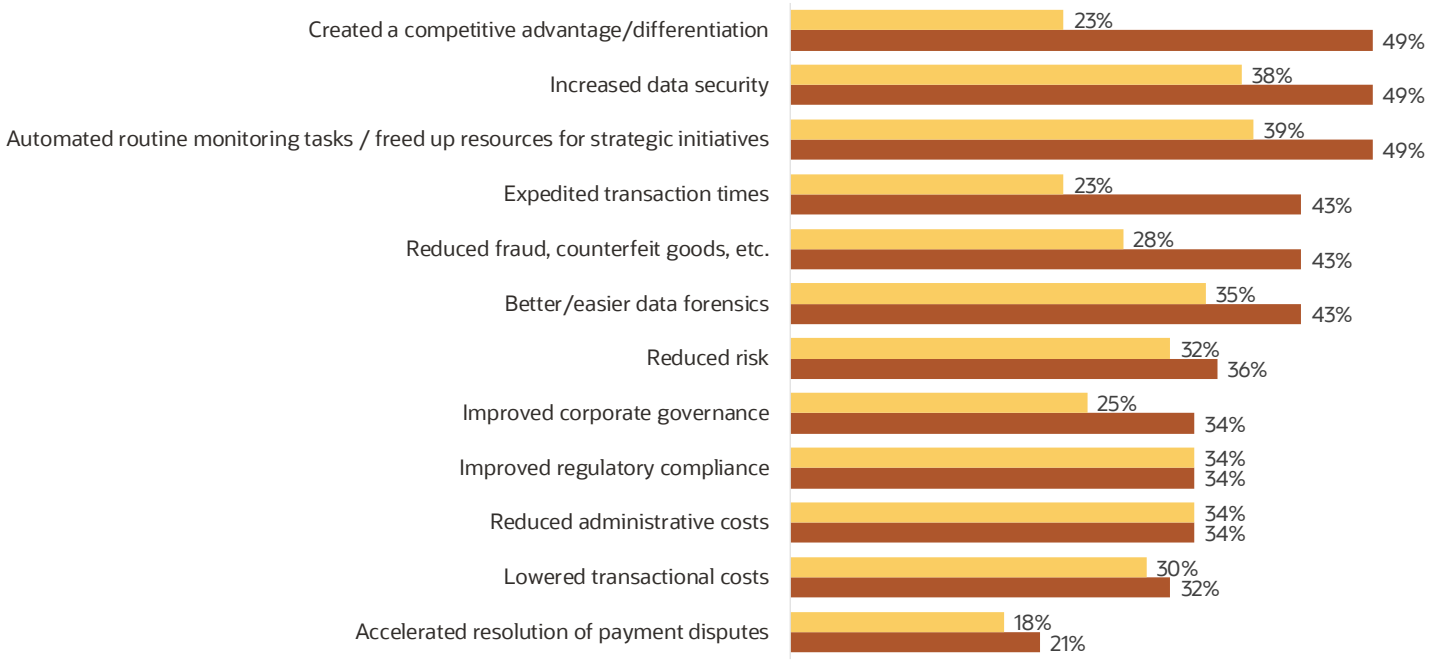
The impact of blockchain use for SCM



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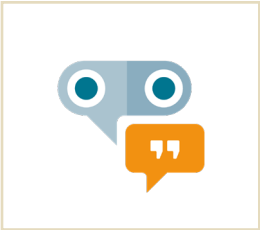
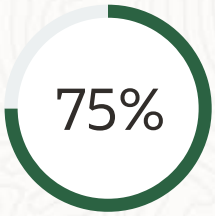


Digital assistants: Delivering greater access to SCM systems

Supply chain partners are becoming increasingly collaborative, sharing resources, responsibilities, and performance metrics to satisfy demanding customers and keep pace with emerging trends. But supply chain complexities, such as legacy systems and poor visibility, can prevent partners from pooling resources and sharing operational intelligence.

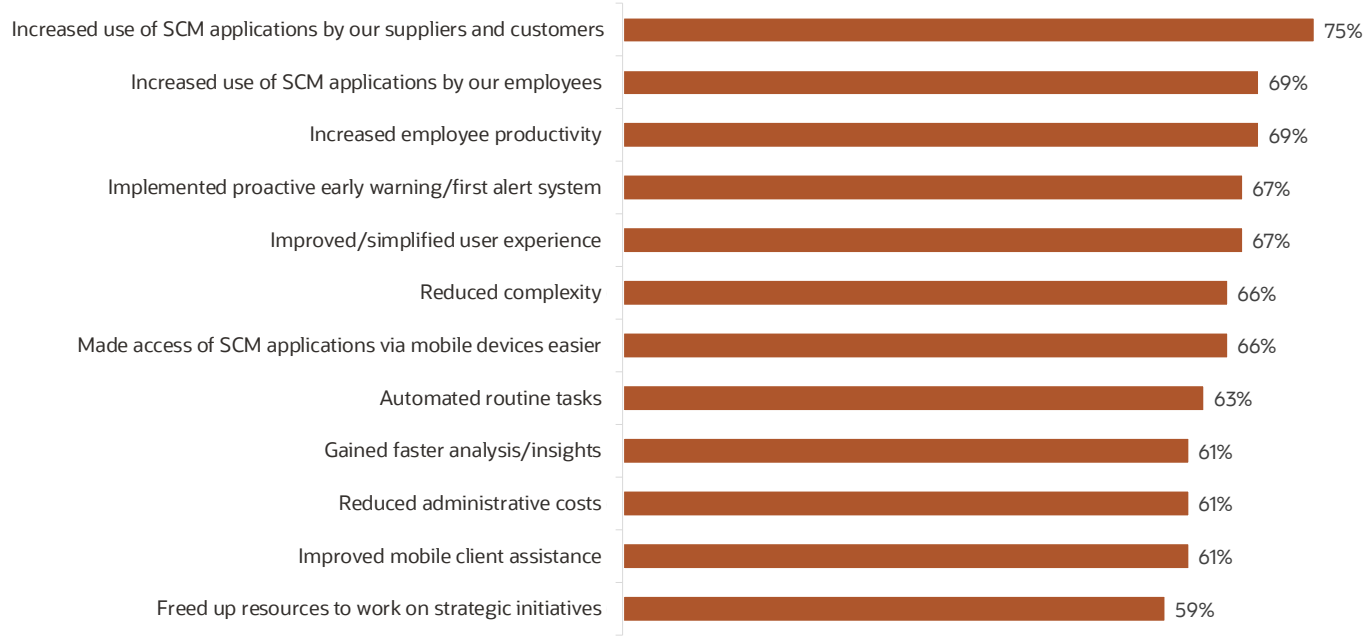


of respondents credit chatbots and intelligent voice assistants for **increasing the use of SCM apps by suppliers and customers.**

In response, many organizations are turning to digital assistants to improve access to SCM systems. By providing an intuitive and conversational user interface, digital assistants can help supply chain partners conduct tasks, such as root-cause analysis, for improved supply chain performance. For example, network members can check on status, track deviations from plans, and report incidents that threaten to impact supply chain efficiencies. Monitoring supply chain activity is a time-consuming task for supply chain partners. With the use of digital assistants, problems are spotted and solved quickly and effectively without the need for resources.

Although relatively new to the supply chain space, digital assistants are already delivering benefits by improving access to SCM systems. For example, 75% of respondents credit chatbots and intelligent voice assistants for increasing the use of SCM apps by suppliers and customers. And 69% of respondents say digital assistant-powered SCM systems not only drive usage among employees, but also increase employee productivity.

The digital assistant benefits for SCM



Question text: Has your organization achieved any of the following benefits by using conversational technologies (such as chatbots and intelligent voice assistants) to provide access to SCM systems? (Percent of respondents reporting benefit achieved N=119/84, depending on benefit)

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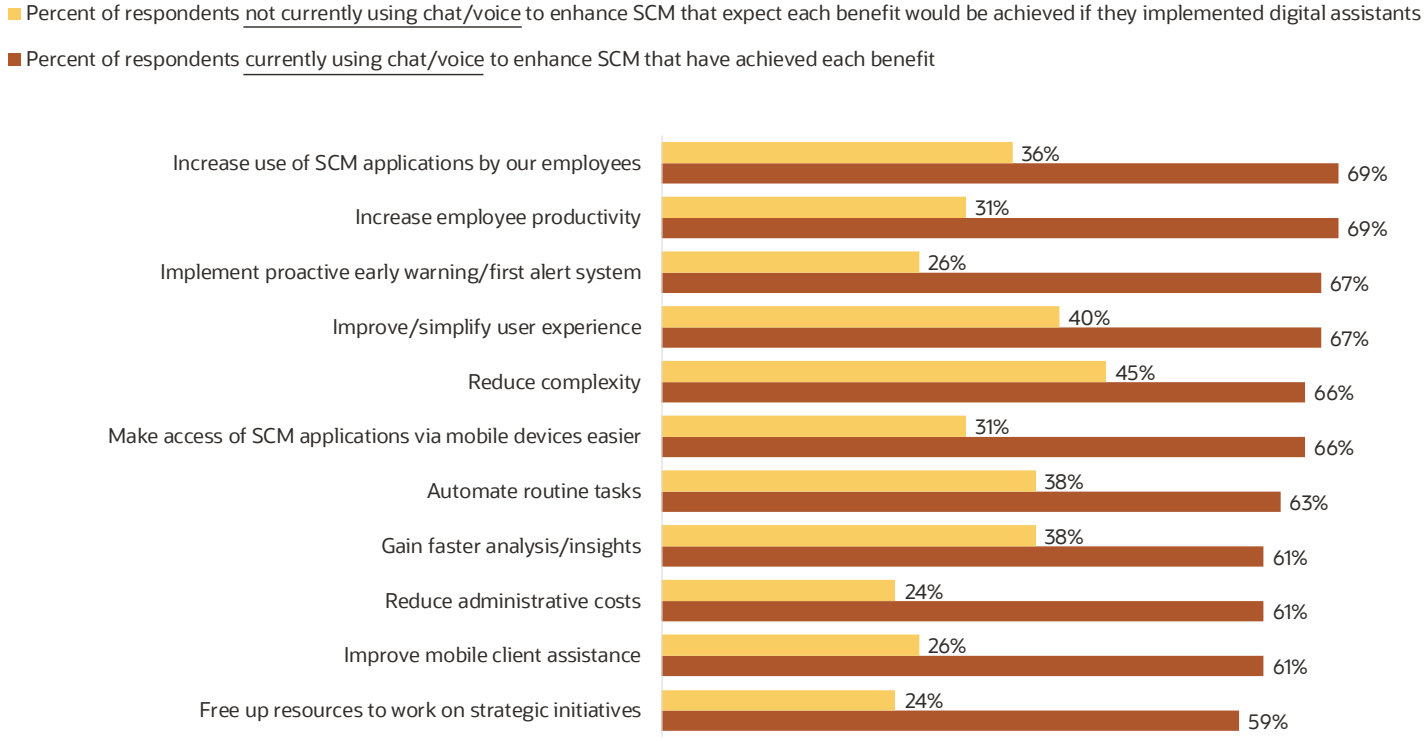
Consider, for example, a chatbot that monitors the performance of a supply chain. Typically if an issue arises, an employee must search for the source of the problem, and come up with a fast solution—an exercise that commands considerable time and resources. A chatbot, on the other hand, can consistently monitor the condition of a supply network, identify problems, proactively alert an employee to found issues, and even fix the problem by modifying transactions on the go. A perfect example is adjusting production output if a digital assistant advises of an upswing in current demand.

In fact, 67% of respondents report implementing a proactive early warning and/or first alert system as a result of using digital assistants to improve SCM access. And the same percentage cites an improved or simplified user experience as digital assistants can automate tasks ranging from demand planning and replenishment to transportation optimization.

It's still early days for digital assistants, which might explain the wide gap between the rate of actual benefits achieved relative to the expectations. SCM usage rates, employee productivity levels, the availability of early warning systems, and improved user experience are all benefits respondents have achieved at a rate that far surpasses the expectations of non-users.

Respondents report a 28% improvement in employee productivity and a 26% uptick in speed of analysis.

Actual digital assistant-driven benefits to SCM outweigh expectations



Digital assistants' quantifiable impact on SCM systems will also drive greater adoption. As it is, respondents report a 28% improvement in employee productivity and a 26% uptick in speed of analysis as a result of incorporating conversational technologies into their SCM solution.

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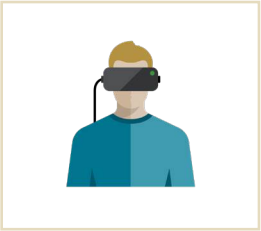
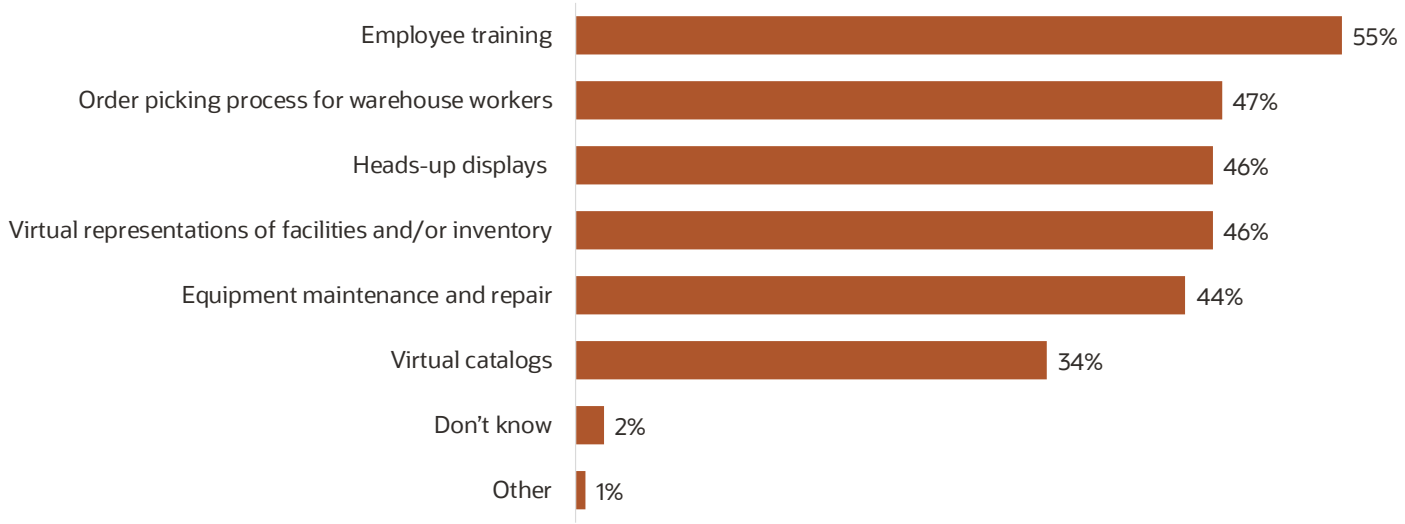


Concrete applications of virtual and augmented reality technologies

Once on the fringes, AR and VR technologies are entering the enterprise space with innovative applications. Canadian e-commerce company, Shopify, for example, joined forces with Apple to create AR Quick Look, which lets online retailers upload 3D models of products onto their Shopify stores. Customers can view products in AR to see how a couch or coffee table might look in a given space.

AR and VR's migration from popular video games to consumer-facing applications is prompting organizations to consider how they might also be used to enhance supply chain operations. More than half (55%) of survey respondents are looking to these tools to improve employee training. For instance, a warehousing course in supply chain management can teach students and employees the fundamentals of the industry, but AR solutions that use glasses or a heads-up display can provide employees with superior hands-on experience.

Innovative use cases for AR/VR technology within SCM



Question text: For which of the following uses cases is your company using (or considering) virtual/augmented reality technology to enhance supply chain operations? (Percent of respondents, N=150)

While examining factory equipment or warehouse facilities, AR training tools can overlay instructions, video examples, and other educational resources, providing users with hands-free, voice-controlled access to information in real time. Better yet, some AR and VR technologies can incorporate real-time data streams from production equipment and performance monitoring systems so that students are working on real-world issues as part of their training.

Warehouse workers also stand to benefit from AR and VR technologies, according to 47% of survey respondents. Enhancing the order picking process is a perfect example. Most warehouses rely on a pick-by-paper approach when it comes to supply chain operations—a slow and error-prone process. But that's changing. At DHL, AR-enabled smart glasses provide employees with a heads-up display that allows them to locate, scan, and sort items, and then place them on a cart based on where they fit best while picking orders. By eliminating the need for handheld scanners and paper-based reference documents, the international courier has increased employee productivity by an average of 15%.

In fact, 46% of respondents point to heads-up displays, which help workers navigate warehouses and drivers identify optimal transportation routes, as an excellent use case for using VR and/or AR to enhance supply chain operations. And 46% of organizations believe VR and AR tools should provide virtual representations of facilities and/or inventory. In some cases, this means configuring a warehouse's physical infrastructure to monitor, track, and analyze live streaming metrics using AR on a mobile device. Other applications include creating a virtual factory that projects images onto a boardroom table so that executives can monitor production status in real time.

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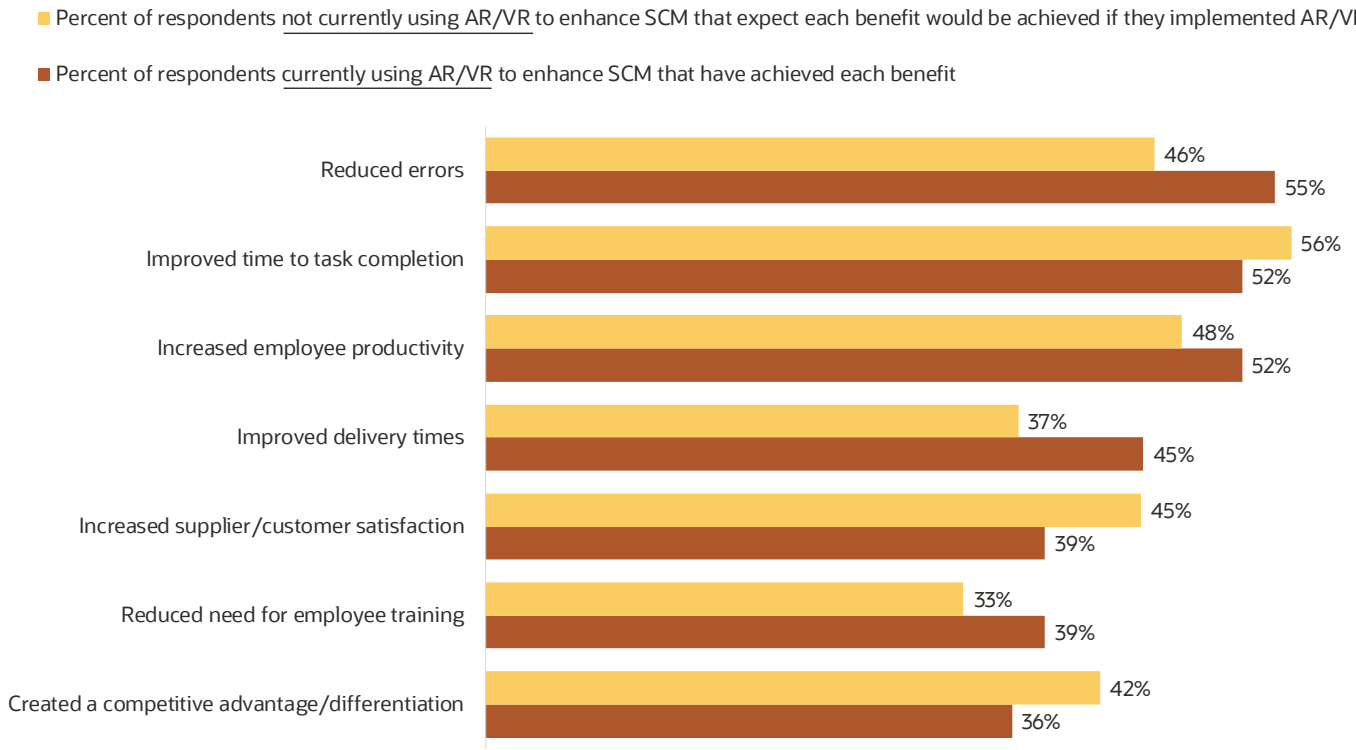
Nearly half (44%) of respondents use VR and AR technologies for equipment maintenance and repair. For example, a factory floor operator may be struggling to repair a piece of equipment. Rather than schedule a follow-up visit or dispatch a second technician, a VR or AR system could allow the worker to pull up a manual or a detailed diagram of the system for a faster resolution.

Thanks to a wide assortment of use cases, VR and AR are already producing benefits for those that leverage their capabilities to enhance SCM. More than half (55%) of respondents note its ability to improve time to task completion, and 49% cite increased employee productivity as an advantage. For instance, AR glasses can provide employees with information about a container's contents, from its origin to special handling instructions, all in real time. In the past, retrieving these details would have required hours spent scanning bar codes, trading emails, and searching documents.

The impact of using AR/VR to enhance SCM meets expectations



Last-mile delivery is another way AR and VR can boost employee productivity in the supply chain space. The final step in the supply chain continuum, last-mile delivery is a costly endeavor and a competitive differentiator, especially as consumers increasingly turn to e-commerce for their shopping needs. Drivers often spend an enormous amount of time locating the right item on a packed delivery truck. An AR device could simplify this process by instantly providing a driver with specific instructions on where to position the item on a truck based on factors such as weight and delivery address. Upon arrival, the device could then highlight the item's exact location, thereby reducing time spent searching for parcels. Smart last-mile delivery can also help reduce package damage and errors, a benefit cited by 49% of survey respondents. Other incentives for AR and VR integration into SCM solutions include increased supplier and customer satisfaction (43%) and a competitive advantage (41%).

85% of AR/VR users report achieving or exceeding ROI expectations.

As with all emerging technologies, AR and VR are having a measurable impact on supply chain operations. 85% of AR/VR users report achieving or exceeding ROI expectations, and 68% expect to reap significant business value from their efforts within one year.

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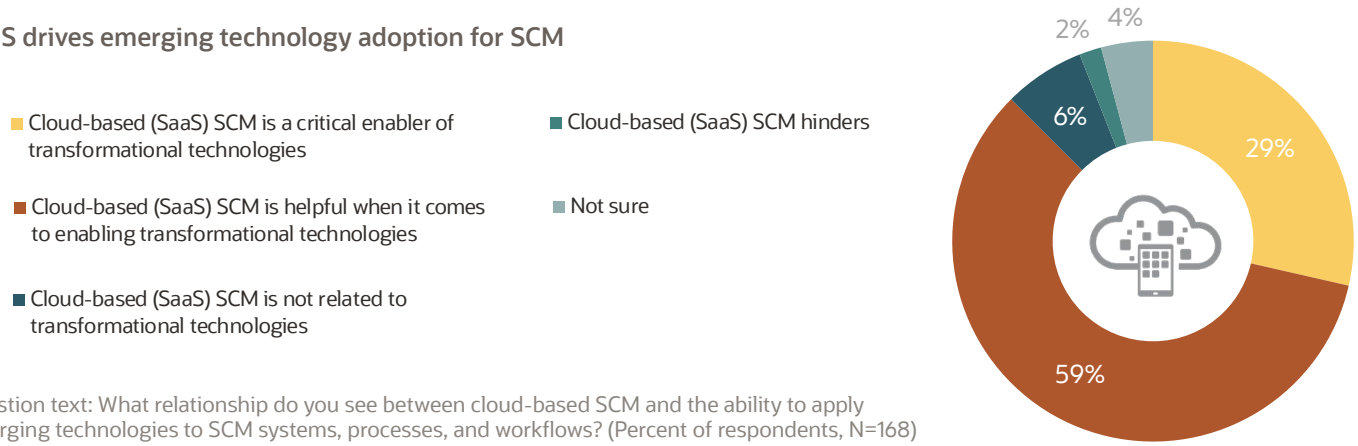
Learning from the leaders: Getting initiatives off the ground

Organizations are frequently retiring legacy on-premises SCM systems, often exploring SaaS-delivered alternatives. One reason: Organizations view the cloud as a better fit for emerging technology applications. A whopping 88% of respondents see SaaS SCM as an enabler of emerging technologies such as AI, IoT, blockchain, and digital assistants.

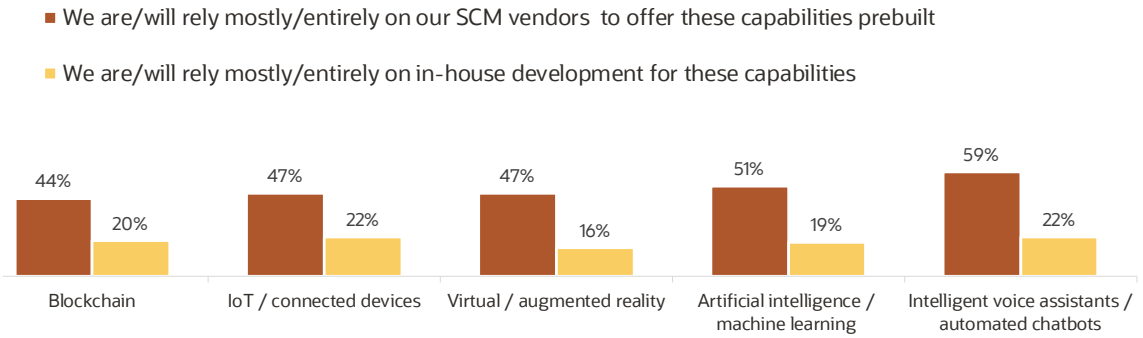
Adding emerging technology capabilities to systems like SCM is an inevitability for most organizations. But only the cloud makes it easy to embed such prebuilt functionality today and future-proof investments with automatic updates from cloud providers. In fact, survey respondents are deploying prebuilt technologies to enhance SCM instead of developing their own solutions at a ratio of about 3:1.

SaaS drives emerging technology adoption for SCM



Question text: What relationship do you see between cloud-based SCM and the ability to apply emerging technologies to SCM systems, processes, and workflows? (Percent of respondents, N=168)

Organizations prefer to buy SCM solutions with emerging technologies rather than build in-house



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preference to buy rather than build emerging technologies

Question text: In which of the following ways is your organization developing and deploying each of the following technologies to improve SCM systems, processes, and workflows (or how do you expect it will in the future)? (Percent of respondents, N=168)

The C-suite needs to understand and see the value of emerging technology in order to invest and drive adoption of these tools. Case in point: Just 14% of organizations whose COOs don't understand the applicability of IoT data to their supply chain are using IoT to improve SCM reporting and workflows. Conversely, 64% of organizations with IoT-adept COOs report using IoT data to enhance SCM in production. This pattern is consistent across all emerging technologies: Companies with emerging tech-fluent COOs are 3.7x more likely to use blockchain, 3.7x more likely to use AI, 3.3x more likely to use digital assistants, and 2.2x more likely to use AR/VR in production than their less fluent counterparts. These numbers highlight the importance of raising C-suite awareness in order to get emerging technology initiatives off the ground and avoid falling behind.

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What makes an SCM market leader

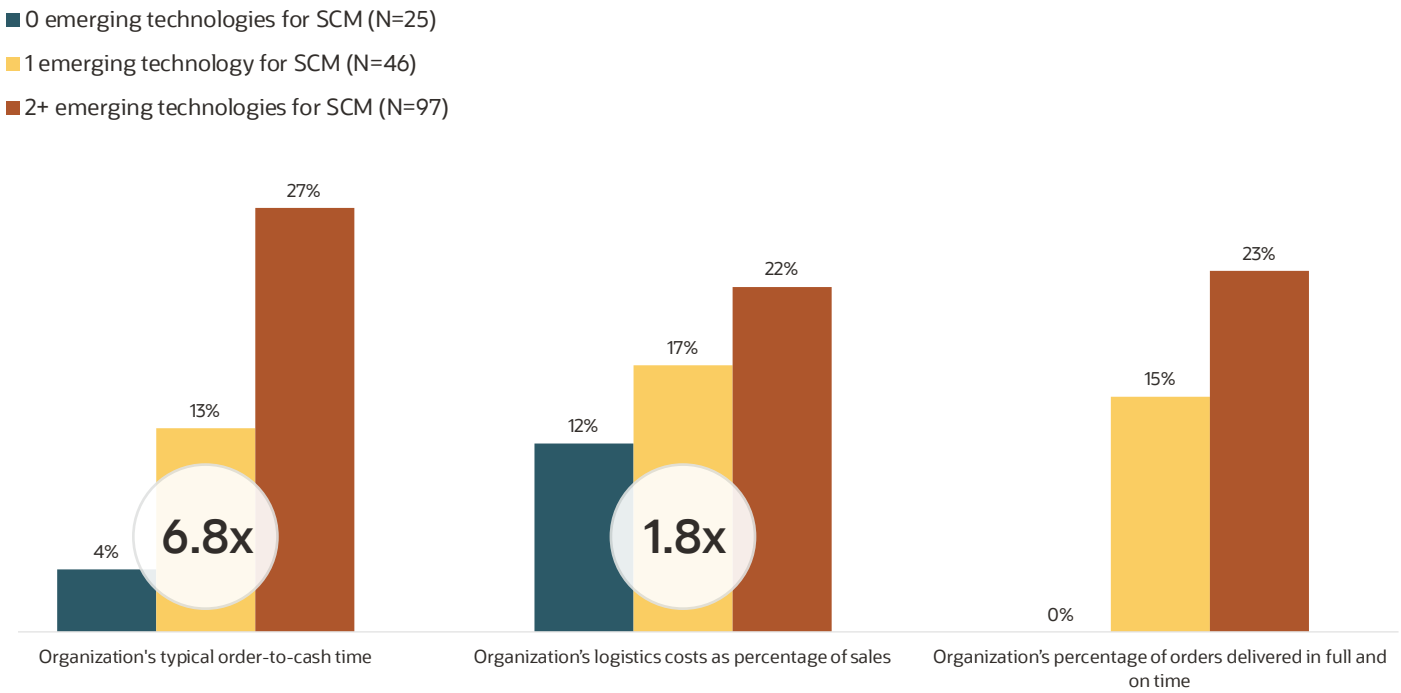
Emerging technologies like IoT and AI are the hallmarks of SCM market leaders. That's because the key benefits they deliver have a direct impact on the overall efficiency of the operations teams.

In fact, our research findings validate the correlation between the number of emerging technologies used to enhance SCM systems and the increasing propensity of the operations team to consider itself market-leading in its ability to accelerate order-to-cash time, deliver orders in full and on time, and minimize logistics costs as a percentage of sales.

> "10 years ago, it took us an average of five days to ship an order. Today, through intelligent automation, we are able to ship 99% of orders the same day they are placed."
>
> - Senior director operations and supply chain of a $30B industrial and electronics manufacturer

Organizations using two or more emerging technologies to enhance SCM are 6.8x as likely to rate themselves as market-leading when it comes to order-to-cash time (27% versus 4%), more likely to be rated as market-leading when it comes to an organization's SCM efficiency (22% versus 12%), and much more likely to be rated as market-leading when it comes to execution, such as delivering orders in full and on time (23% versus 0%).

The measurable gains among market leaders



Percent of organizations that rate their supply chain performance as "market leading"

This data underscores an important point: In many instances, emerging technologies can complement one another, amplifying the benefits of each. Consider, for instance, an employee who is using AR glasses to learn how to operate a particular piece of machinery. Using IoT sensors, the employee can receive real-time performance metrics on the machine's health to enable real-world troubleshooting. When it comes to using emerging technologies to improve supply chain performance, the data shows that while some is good, more is better.

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Research Methodology and Demographics

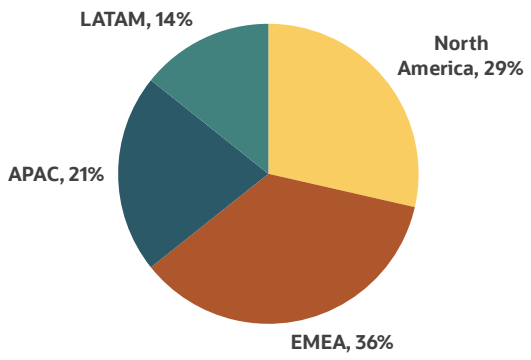
To gather data for this report, Oracle and ESG conducted a comprehensive online survey of managers and executives in the finance or operations functional units of their organizations. All respondents were required to be frequent users of ERP, EPM, or SCM applications. Moreover, only respondents working at organizations with 1,000 or more employees or with annual revenues of $100M or more were qualified. Respondents were based in US, Canada, UK, Germany, France, Netherlands, Saudi Arabia, the UAE, Australia, India, Singapore, Brazil, and Mexico, and the survey was fielded between September 19, 2019 and October 16, 2019.

After filtering out unqualified respondents, removing duplicate responses, and screening the remaining completed responses (on several criteria) for data integrity, a final sample of 700 respondents remained.

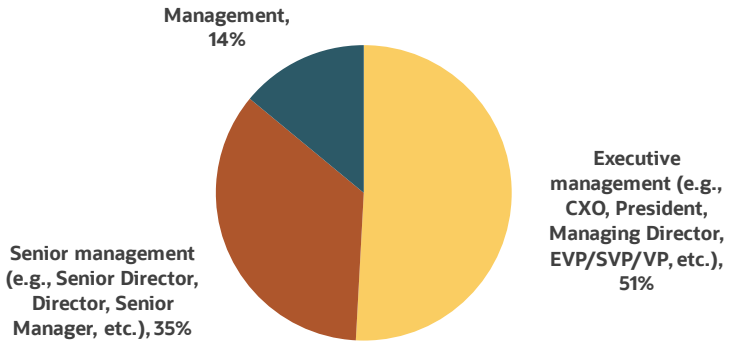
All respondents were provided an incentive to complete the survey in the form of cash awards and/or cash equivalents. Note: Totals in figures and tables throughout this report may not add up to 100% due to rounding. The following tables outline the respondent demographics and firmographics, including respondents' geographic location and seniority, as well as their organizations' industry, employee count, and annual revenue.

Respondent demographics and firmographics

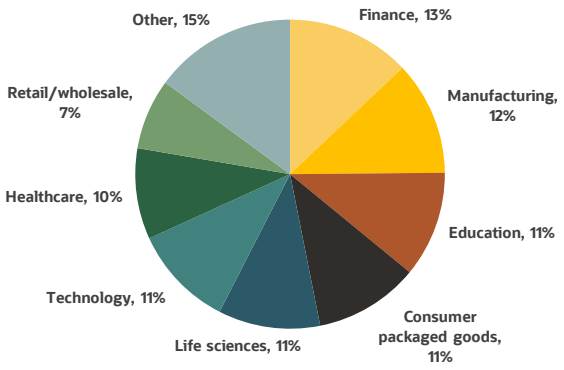
Respondents by region
(percent of respondents, N=700)



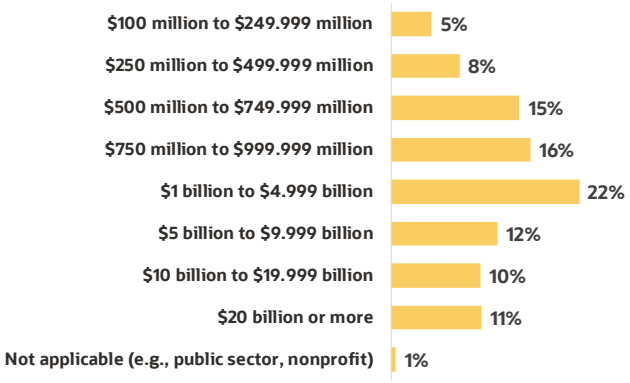
Respondents by role
(percent of respondents, N=700)



Respondents by industry
(percent of respondents, N=700)



Respondents by revenue (US dollars)
(percent of respondents, N=700)



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