2019 CIO Agenda: Transportation Industry Insights

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Analyst(s): Venecia Liu, Thierry Kuperman Le Bihan

The CIO Survey reflects transportation CIOs must build closer relationships with stakeholders to overcome barriers to digital progress, and leverage the strengths of other business and technology partners in the ecosystem.

Key Findings

- Transportation CIOs identify “digital” as the top business priority during the next two years.
- One-quarter of transportation CIOs see artificial intelligence (AI) as a game-changing technology, moving up to second place, after data analytics.
- Lack of IT resources and digital skills limit transportation CIOs’ ability to execute on their objectives.

Recommendations

Transportation CIOs striving for leadership in innovation and strategic business change should:

- Plan a digital business technology platform, and include their desired future state of services. Use the framework across the five components to fuel discussion to prioritize an architectural strategy to scale their digital ambition.
- Involve other business unit leaders to identify where AI can be leveraged across the organization to build an AI strategy rather than a disjointed, multivendor point product. Look to other industries for ideation.
- Partner with IT services firms, startups or software providers to fill the gap in IT resources and skill sets. In some cases, these third-party providers may be willing to share costs if it is considered a leading-edge solution that will get them recognition and future business.

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Survey Objective

The purpose of the 2019 Gartner CIO Survey is to help CIOs and other IT leaders set and validate their management agendas for the coming year. To achieve this, Gartner gathered data from 3,102 CIO respondents in 89 countries and across major industries, representing $15 trillion in revenue and public-sector budgets and $284 billion in IT spending. Respondents came from a range of industries, including manufacturing, government, professional services, banking, energy/utilities, education, insurance, retail, healthcare, transportation, communications and media.

This report focuses on the 130 transportation CIO respondents, and compares them with the segments top, typical and trailing performers (see Note 1).

The report focuses on the following key questions:

- Which of these best describes the stage of your organization's digital initiative — that is, your organization's digitalization efforts (no digital, ambition, design, deliver, scale, refine)?
- What would you say is your organization's top priority for 2018 and 2019?
- Which technology area do you expect will be a "game changer" for your organization?
- What are the technology areas where your organization will be spending the largest amount of new or additional funding in 2019?
- What are the technology areas where your organization will be reducing funding by the highest amount in 2019 compared to 2018?
- Which of these are the most significant barriers to achieving your objectives as CIO?
- What is your key strategy for overcoming barriers and achieving your objectives in your role?

Together, the answers to these questions offer some revealing insights into how transportation CIOs are planning to transform themselves and transform both their business and the IT that supports it. This data, together with Gartner's interaction with clients and coverage of the industries, is the basis for the analysis and recommendations within this document. This is linked to the key initiative of CIO Leadership in Innovation and Strategic Business Change.

The full survey, covering more than 50 questions, was designed to prove or disprove a series of hypotheses devised by a core team of Gartner research analysts and Executive Programs representatives. The key findings from the total dataset are published in their entirety as "The 2019 CIO Agenda: Securing a New Foundationfor Digital Business."

Data Insights

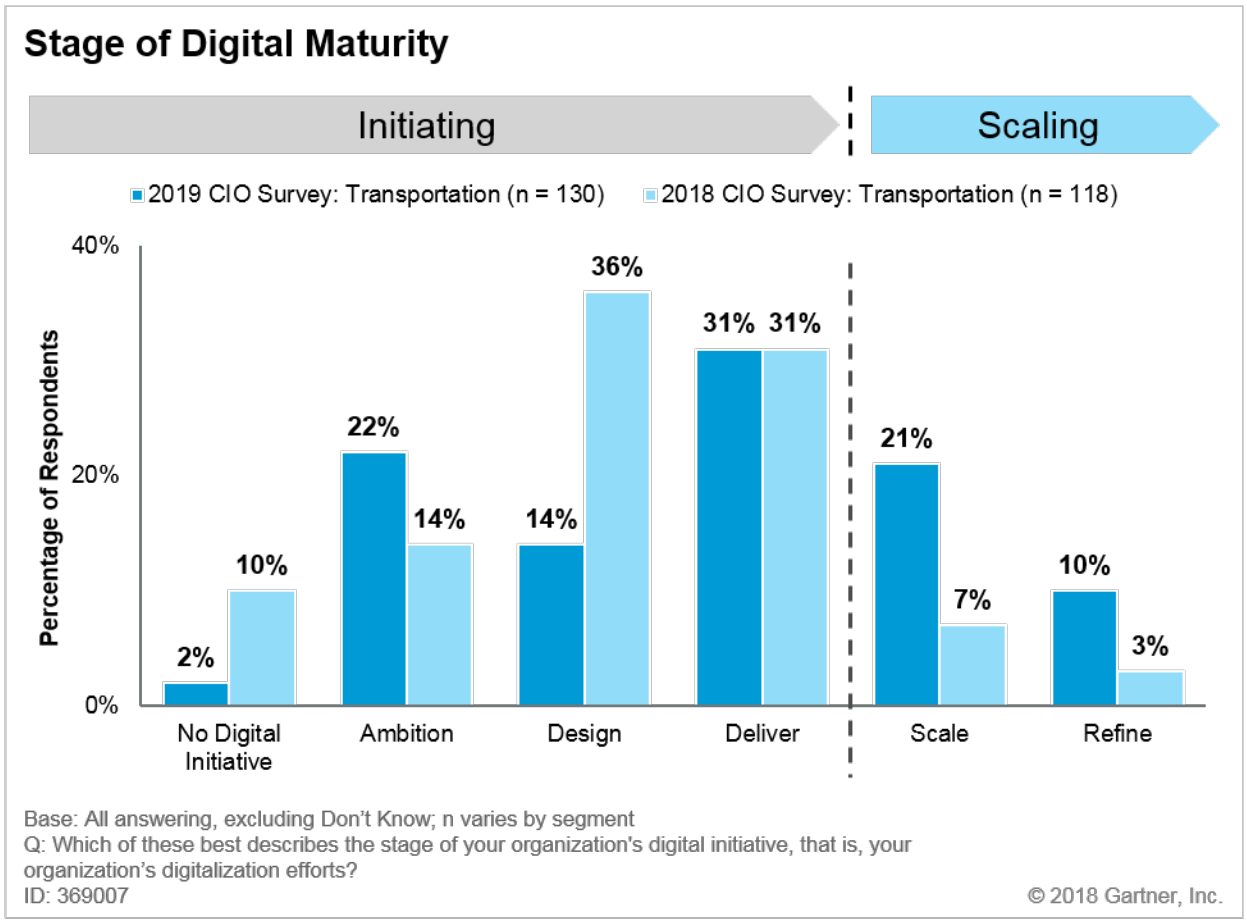
Scaling Digital Business to Digital Maturity

The digital platform economy has disrupted the passenger transport industry over the years with Uber, Didi Chuxing, Ola, Grab and Lyft. There will also be a heavy impact on cargo and freight

transport with autonomous vehicle transport, drone delivery, blockchain, new business models and new market entrants. Amazon launched Amazon Prime Air for air cargo transport leasing planes several years ago and moved into package delivery with drones. Recently, it launched the Amazon Delivery Service Partner to empower entrepreneurs to move into the last-mile logistics delivery service.

Transportation CIOs have been seeking ways to join the digital wave and monetize new services. DB Schenker invested in uShip to launch a digital marketplace to match supply and demand with its Drive4Schenker in Europe. It is in the midst of scaling this digital platform to attract truck drivers to join, to transport the 5,000 loads a day of requests. Other transportation CIOs are also moving from designing digital initiatives to delivering digital initiatives, and into scaling the business. Fourteen percent of transportation CIOs indicate they are designing digital projects, 31% are delivering and 21% of respondents indicate they are now scaling the business. As a qualitative comparison from last year's 2018 study, we can see a progression of transportation CIOs moving further into their stage of digital maturity. Last year, 36% of respondents indicated they were in the design phase, 31% in the deliver phase and 7% in scale phase (see Figure 1 and Note 2).

Figure 1. Transportation CIOs' Stage of Digital Maturity, Comparing 2018 Versus 2019



Data is from the 2019 Gartner CIO Survey.
See Tables 1 and 2 for the definitions used in the 2018 and 2019 Gartner CIO surveys.

Source: Gartner (October 2018)

Transportation companies are on various stages of digitization. Some entities such as public transport don't have available funds to innovate fast enough on their digital journey. Through the years, partnerships with the private sector and startup companies are bringing innovation and helping to accelerate their digital strategy. For many years, transit authorities have supported the Google Transit API using General Transit Feed Specification as a common format for public transportation schedules. This has enabled transparency to the public in time schedules and routes. Now, transit authorities are looking to scale the business by providing "mobility as a service" or mobility platforms to deliver multimodal and passenger journey planning (see "Transportation Network Intermediaries Will Disrupt Smart Mobility"). This combines multiple types of public transport services such as subway, bus, train and bike sharing with private transport services such as car sharing services, as well as extends services to parking and electric charging stations.

Another transport example of scaling digital business is TradeLens. This initiative began with IBM and Maersk as a blockchain pilot designed to see if blockchain technology could be used to support information sharing and transparency in a more efficient and secure manner. This initiative has gained global scale in the supply chain, and now, more than 20 port and terminal operators have joined this initiative. Additionally, it has spread to a wider ecosystem of participation from other global container carriers, multiple customs authorities, cargo owners, forwarders and other logistics companies.

In air transport, SITA is in the midst of scaling its blockchain project called Aviation Blockchain Sandbox. SITA designed FlightChain together with British Airways, Heathrow Airport, Geneva Airport and Miami International Airport to use blockchain technology as a smart contract to share flight data. Now, SITA is inviting other airlines and aviation authorities to participate in order to scale blockchain in aviation.

Recommendations for Transportation CIOs

- Assess your digital ambition (see "Digital Business Ambition: Transform or Optimize?"), and then perform a gap analysis between digital ambition and reality with your IT systems and IT portfolio.
- Assess your digital maturity and ability to deliver on the capability and digital initiatives outlined by the executive team.
- Adopt a bimodal approach to IT strategy to create an agile operations for digital business. Start with "Kick-Start Bimodal IT by Launching Mode 2," and then examine research documents "The Most Common Barriers to Adopting Bimodal, and How to Overcome Them" and "Bimodal Simplifies and Focuses Digital Transformation." For CIOs further along in their bimodal strategy, the focus is then on scaling bimodal. For further information on this, see "Scaling Bimodal — Fusing IT With the Business: A Gartner Trend Insight Report."

Digital Business Technology Platform

To achieve scale in digital business, CIOs need to evolve their current IT landscape into a digital business technology platform to support new service delivery and the new business models. Most IT system portfolios are not enough to support digital business, and require a bimodal IT strategy and a technology platform framework based on the enterprise's digital ambition (see "A Digital Business Technology Platform Is Fundamental to Scaling Digital Business").

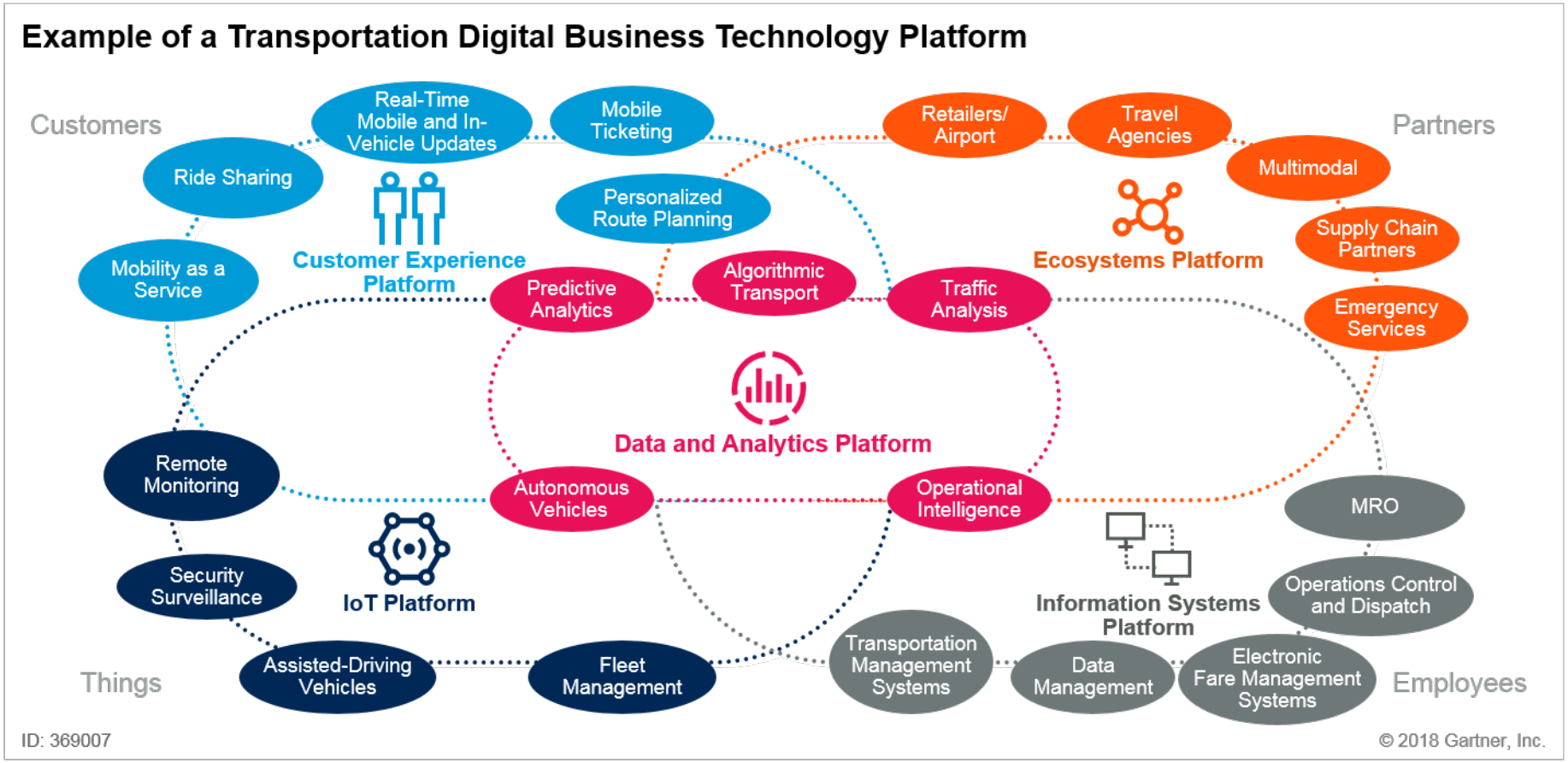
Gartner defines a digital business technology platform as supported in five areas and has developed a visual representation of these five areas (Figure 2 has been adapted to highlight transportation).

- **Information systems platform —** Supports the back office and operations, such as ERP and core systems.
- **Customer experience platform —** Contains the main customer-facing elements, such as customer and citizen portals, multichannel commerce, and customer apps.

- **Data and analytics platform —** Contains information management and analytical capabilities. Data management programs and analytical applications fuel data-driven decision making, and algorithms automate discovery and action.
- **Internet of Things (IoT) platform —** Connects physical assets for monitoring, optimization, control and monetization. Capabilities include connectivity, analytics and integration to core and operational technology (OT) systems.
- **Ecosystems platform —** Supports creation of, and connection to, external ecosystems, marketplaces and communities. API management, control and security are its main elements.

The challenge for many transportation companies and transport authorities is that, oftentimes, these areas appear to be disjointed. There are challenges with OT integrating with IT systems, and the influx of IoT and passenger data resides in different databases. Figure 2 shows an example of the components for the digital business technology platform along these five areas for transportation. Again, some aspects are aspirational, but they are areas that can be considered. For example, the intersection of IoT and intelligence, or data and analytics platform could be autonomous vehicles. Passenger experience could also be considered as customer experience in a B2B context for freight forwarders, ground handlers, airline food caterers and duty free merchants, for example. This framework illustrates a high-level overview of capabilities to assemble a digital business technology platform, but, in practice, there are multiple layers to implement and integrate it (see “Use Application Architecture, Infrastructure and Integration to Implement Digital Business Technology Platforms”). As application, data and services build the foundation for digital business, your application portfolio and architecture should be flexible with an API program (see “Adopt a Multigrained Mesh App and Service Architecture to Enable Your Digital Business Technology Platform”).

Figure 2. Example of a Transportation Digital Business Technology Platform



MRO = maintenance, repair and overhaul

Source: Gartner (October 2018)

As transportation CIOs seek to deliver and scale their digital business and build out their digital business technology platform, it is no surprise digital is the top business priority for the next two years, according to 22% of transportation CIOs (see Figure 3). This is in line with top performing and typical CIOs worldwide. Operational excellence is listed as the top priority by 18% of transportation CIO respondents, and 16% of respondents focus on revenue and business growth.

Figure 3. Top Priorities for 2018 and 2019

Top Priorities for 2018 and 2019

Percentage of Respondents

	Transportation (n = 119)		Top Performers (n = 225)		Typical Performers (n = 2,244)		Trailing Performers (n = 274)	
1	Digital	22%	Digital	31%	Digital	23%	Revenue/business growth	24%
2	Operational excellence	18%	Revenue/business growth	20%	Revenue/business growth	21%	Operational excellence	15%
3	Revenue/business growth	16%	Operational excellence	16%	Operational excellence	13%	Cost optimization/reduction	11%
4	Customer experience	14%	Customer experience	11%	Customer experience	9%	Digital	10%
5	Cost optimization/reduction	11%	Data and analytics	7%	Cost optimization/reduction	8%	Business or financial goals	8%
6	Industry-specific	10%	New products and services	7%	Business or financial goals	7%	Modernization (of legacy systems)	7%
7	New products and services	5%	Cost optimization/reduction	7%	Business model change	6%	Data and analytics	7%
8	Modernization (of legacy systems)	4%	Artificial intelligence or machine learning	6%	Industry-specific	6%	Industry-specific	7%
9	Business model change	4%	Business model change	6%	Data and analytics	5%	ERP	6%
10	Business or financial goals	4%	Industry-specific	6%	New products and services	5%	Business model change	5%

Base: All answering, excluding Prefer Not to Answer; n varies by segment
Showing the 10 most common answers per segment; coded open-text responses; multiple responses allowed
Q: What would you say is your organization's top priority for 2018 and 2019?
ID: 369007

Data is from the 2019 Gartner CIO Survey.

Source: Gartner (October 2018)

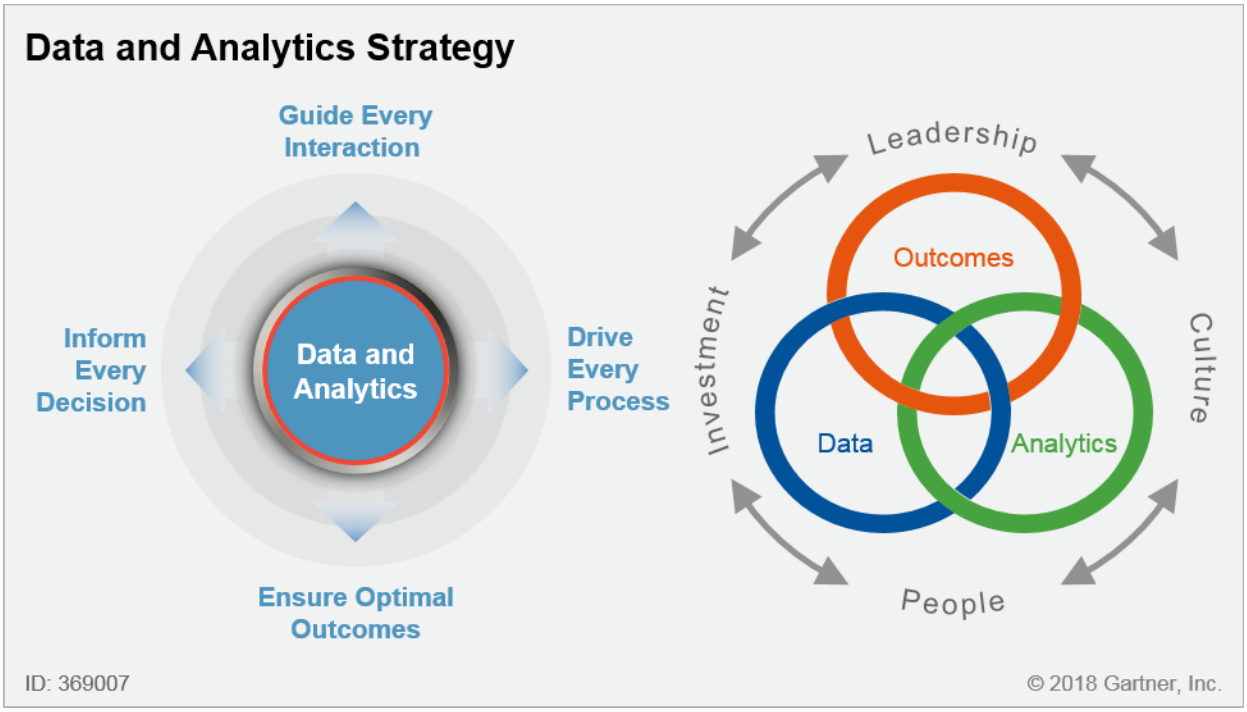
Recommendations for Transportation CIOs

- Examine each of the five component areas within the digital business technology platform framework, and outline the application and service areas relevant to your organization.
- Explore future transport services and passenger services in your roadmap, and assess how they could be configured onto the framework.
- Assess your capabilities to enhance the technology platform, and work with your application leaders to build an API model.

Game-Changing Technologies: Data and Analytics, and AI

In the era of digital business, technology not only is essential, but can be leveraged as a weapon for differentiation. In digital business, data and analytics unlocks infinite possibilities to deliver business value. This requires data to be viewed not in silos, but as a distributed dynamic data source and strategy that can power any decision and activity across the organization and externally to the ecosystem (see Figure 5). Gartner's forward-thinking research aims for organizations to view data and analytics as a dynamic strategy (see "100 Data and Analytics Predictions Through 2022").

Figure 4. Data and Analytics Strategy



Source: Gartner (October 2018)

Transportation CIOs recognize the importance of data and analytics, and 36% of the survey respondents concur that it is a game-changing technology (see Figure 5). Transportation companies are using data analytics to excel their business performance. For example, airlines are tapping into

customer data to identify purchasing behavior, routing preference, travel partners or family relations, home airport, onboard purchases, and other data for upsell opportunities and personalized services. United Airlines estimates a 15% increase in revenue year over year by tapping into its customer profiles. Data and analytics is also used to determine asset health and performance in rail MRO, route planning for new bus routes, optimized route delivery in trucking, inventory planning and supply chain logistics, and personnel assignments. Data can also be leveraged for multimodal transportation, smart city projects and other government agencies with open-data initiatives.

Figure 5. Game-Changing Technologies

Game-Changing Technologies

Percentage of Respondents

	Transportation (n = 121)		Top Performers (n = 230)		Typical Performers (n = 2,329)		Trailing Performers (n = 276)	
1	Data analytics (including predictive analytics)	36%	Artificial intelligence-machine learning	40%	Artificial intelligence-machine learning	25%	Artificial intelligence-machine learning	24%
2	Artificial intelligence-machine learning	25%	Data analytics (including predictive analytics)	23%	Data analytics (including predictive analytics)	25%	Data analytics (including predictive analytics)	21%
3	Internet of Things	17%	Cloud (including XaaS)	12%	Cloud (including XaaS)	10%	Cloud (including XaaS)	14%
4	Cloud (including XaaS)	9%	Digital transformation	10%	Internet of Things	10%	Internet of Things	11%
5	Automation	7%	Mobile (including 5G)	7%	Digital Transformation	9%	Digital transformation	7%
6	Blockchain	7%	RPA	6%	Mobile (including 5G)	6%	Industry-specific	5%
7	Mobile (including 5G)	6%	Internet of Things	6%	Automation	5%	Business intelligence	5%
8	Autonomous vehicles	5%	Blockchain	5%	Blockchain	4%	Automation	5%
9	Business intelligence	4%	Automation	3%	Industry-specific	4%	Blockchain	5%
10	ERP	3%	Information technology	3%	Business intelligence	3%	Mobile (including 5G)	5%

Base: All answering, excluding Prefer Not to Answer; n varies by segment
Showing the 10 most common answers per segment; coded open-text responses; multiple responses allowed
Q: Which technology area do you expect will be a game changer for your organization?
ID: 369007

Data is from the 2019 Gartner CIO Survey.
RPA = robotic process automation

Source: Gartner (October 2018)

AI has made a big entrance as the second-ranked game-changing technology, as mentioned by 25% of transportation CIO Survey respondents. Last year, in the Gartner CIO Survey, AI was not listed in the top 10 by the aggregated transportation CIO group, but was listed among respondents in airline and warehousing, courier, and logistic firms. In this 2019 survey, AI surged to the No. 2 spot, recognizing the power of this technology. While initial implementations of AI have been chatbots within the call center environment and autonomous vehicles, transportation companies are also looking to AI for RPA. Transportation CIOs can use the AI maturity model as an indicator to accelerate their AI strategy (see "Artificial Intelligence Maturity Model").

There are synergies across the top three game-changing technologies, as several companies look to autonomous vehicles with IoT sensors, combined with data and analytics. Overall, autonomous vehicles ranked further down the list as a game changer, with only 5% of transportation respondents. In airlines, Airbus is working with its subsidiary company, Testia, to develop an automated drone in the MRO (maintenance, repair and overhaul) space. The drone can maneuver over the aircraft and scan the exterior body to search for anomalies or defects by comparing this to the huge dataset of specifications. The drone can also upload the video images and will reduce inspection time considerably. The technology is currently awaiting regulatory approval.

Transportation companies have benefited from IoT implementations such as increased asset productivity, cost savings, improved driver health and safety, increased visibility into the supply chain, and predictive maintenance (see "Trenitalia Drives Cost Savings Using IoT on Train Operations").

Transportation CIOs must bear in mind that IoT and AI should not be considered as a one-off project, but should be viewed across the organization for synergies. We have seen several IoT projects that never scaled beyond proof of concept because IoT was not viewed as a holistic strategy with a clearly defined business objective and benefit. Another challenge we see with one-off implementations of IoT is that it has resulted in an implementation with multiple vendors and systems that have different IoT protocols, and integration across becomes a challenge. Transportation CIOs should examine synergies across the technologies as well as application use cases across the entire organization.

Recommendations for Transportation CIOs

- Ensure your data and analytics strategy is a continuous cycle to drive outcomes.
- Assess how your peers are using technologies to build on your inventory of use cases. Ensure technology is not implemented as a product implementation, but viewed holistically as a strategy that can be leveraged across the organization.
- Seek technology partners willing to invest and develop the solution implementation jointly, especially for new technologies as they would want to gain visibility of this project.

Pervasive Investments in Data and Analytics

As cited earlier, data and analytics plays an important role in delivering on the business value and business performance of an organization. As such, investments continue in business intelligence and analytics, with 45% of transportation CIO respondents indicating an increase in budget

allocation to this technology in 2019 (see Figure 6). Other areas of increased investment in 2019 reported by our survey respondents are customer and user experience (36% of respondents); cyber and information security (35% of respondents); cloud services (34% of respondents); and core system improvements and transformation (32%).

There have been examples of cybersecurity attacks on the transportation network and customer data breaches. When OT systems underwent a modernization effort and connected to the internet, they were then exposed to cybersecurity. Now, with the proliferation of IoT data, there are also challenges for security of these IoT endpoints. Transportation CIOs can benchmark their cybersecurity investments from the following reports “In Detail: Outlook for 2018 Information Security Budget and Staffing” and “IT Key Metrics Data 2018: Key IT Security Measures: by Industry.”

Figure 6. Technology Funding Expected to Increase in 2019

Technology Funding Expected to Increase in 2019

Percentage of Respondents

	Transportation (n = 128)		Top Performers (n = 248)		Typical Performers (n = 2,540)		Trailing Performers (n = 298)	
1	Business intelligence or data analytics solution	45%	Artificial intelligence/machine learning	48%	Business intelligence or data analytics solution	46%	Business intelligence or data analytics solution	43%
2	Customer/user experience	36%	Business intelligence or data analytics solution	41%	Cyber/information security	40%	Cyber/information security	43%
3	Cyber/information security	35%	Digital business initiatives	40%	Cloud services or solutions	32%	Cloud services or solutions	38%
4	Cloud services or solutions	34%	Customer/user experience	34%	Core system improvements/ transformation	32%	Core system improvements/ transformation	31%
5	Core system improvements/ transformation	32%	Cyber/information security	33%	Digital business initiatives	32%	Enterprise resource planning	22%
6	Digital business initiatives	27%	Cloud services or solutions	31%	Customer/user experience	30%	Automation	20%
7	Artificial intelligence/machine learning	27%	Core system improvements/ transformation	27%	Artificial intelligence/machine learning	27%	Infrastructure and data center	20%
8	Mobile applications	26%	Automation	24%	Mobile applications	22%	Customer/user experience	19%
9	Automation	24%	Infrastructure and data center	23%	Automation	22%	Technology integration	19%
10	Technology integration	24%	Mobile applications	22%	Technology integration	21%	Software development or upgrades	18%

Base: All answering, excluding Prefer Not to Answer; n varies by segment
Showing the 10 most common answers per segment; multiple responses allowed; pick from a list
Q: What are the technology areas where your organization will be spending the largest amount of new or additional funding in 2019?
ID: 369007

Data is from the 2019 Gartner CIO Survey.

Source: Gartner (October 2018)

Recommendations for Transportation CIOs

- Prioritize investments based on your portfolio requirements and the strategic imperatives of the executive leadership. For example, if you plan to scale digital business, do you have the technology investments in place to build your technology platform on your core system?
- Benchmark your IT budgets against your peers.
- Evaluate your investments in cybersecurity. Assess your security on your operational network and IoT endpoints.

Biggest Budget Cuts in 2019

As cloud continues to gain industry traction, transportation CIOs are reducing spend on their own infrastructure and data center. Several years ago, Malaysian Airlines started its cloud initiative with Microsoft Azure and IT services partner TCS to replace its existing data centers and migrate commercial, operations and corporate systems to the cloud. Earlier in 2018, Ryanair announced its plan to close most of its data centers over three years to migrate to Amazon Web Services (AWS) and standardize on AWS technologies, including Amazon Kinesis. Technology providers, too, are re-examining how software and services are delivered through software as a service and platform as a service models, in addition to infrastructure as a service.

Third-party logistics providers and trucking companies have also moved applications to the cloud to enable visibility for their customers and, in some cases, customers of their customers, into the supply chain. Rather than maintaining the software and infrastructure to maintain the application, they look to service providers to provide the updates. Thus, these companies are also reducing IT budgets.

Thirty-seven percent of transportation CIO respondents will also reduce spend on infrastructure and data center in 2019 (see Figure 7). This is followed by ERP (20% of respondents) and networking, voice and data communications (18% of respondents). CIOs can examine the principles to help with their decisions on sourcing strategies, see “Infrastructure Services Sourcing Strategy: Practical Principles for Dynamic Insourcing Versus Outsourcing.”

Figure 7. Technology Funding Expected to Decrease in 2019

Technology Funding Expected to Decrease in 2019

Percentage of Respondents

	Transportation (n = 120)		Top Performers (n = 232)		Typical Performers (n = 2,316)		Trailing Performers (n = 271)	
1	Infrastructure and data center	37%	Infrastructure and data center	31%	Infrastructure and data center	36%	Infrastructure and data center	35%
2	Enterprise resource planning	20%	Enterprise resource planning	15%	Networking, voice and data communications	16%	Networking, voice and data communications	12%
3	Networking, voice and data communications	18%	Networking, voice and data communications	14%	Enterprise resource planning	14%	Software development or upgrades	11%
4	Software development or upgrades	15%	Software development or upgrades	13%	Software development or upgrades	14%	Enterprise resource planning	11%
5	Core system improvements/ transformation	8%	Core system improvements/ transformation	9%	Core system improvements/ transformation	9%	Core system improvements/ transformation	11%
6	Communications/connectivity	8%	Communications/connectivity	7%	Communications/connectivity	9%	Communications/connectivity	5%
7	Mobile applications	3%	Cloud services or solutions	3%	E-commerce/citizen portal/website	4%	Customer relationship management solutions	5%
8	Customer relationship management solutions	3%	E-commerce/citizen portal/website	3%	Customer relationship management solutions	3%	E-commerce/citizen portal/website	4%
9	Technology integration	3%	Customer relationship management solutions	3%	Mobile applications	3%	Technology integration	3%
10	Digital business initiatives	2%	Technology integration	3%	Technology integration	3%	Cyber/information security	3%

Base: All answering, excluding Prefer Not to Answer; n varies by segment
Showing the 10 most common answers per segment; multiple responses allowed; pick from a list.
Q: What are the technology areas where your organization will be reducing funding by the highest amount in 2019 compared with 2018?
ID: 369007

Data is from the 2019 Gartner CIO Survey.

Source: Gartner (October 2018)

Recommendations for Transportation CIOs

- Assess — realistically — your team's ability and skill sets to maintain the existing IT infrastructure, while striving toward a digital business technology platform and future-state IT.
- Consider multiple sourcing approaches based on your timeline and requirements.

Breaking Down Barriers

For most transportation CIOs to achieve the delivery and scale of digital business, they need the resources and skills. These areas continue to come up as the biggest barriers to achieve their objective, not only among transportation CIOs, but for many companies (see Figure 8). The top three areas are almost equally viewed as a barrier, with 41% of respondents citing insufficient numbers of IT-business resources, 40% of respondents citing insufficient depth/breadth of digital skills and 40% of respondents citing business culture blocking change. It is interesting to note that top performers rank "technology challenges blocking change" over "business culture blocking change," which is opposite for transportation CIO respondents. However, if we examine the percent of respondents, top performers (at 26%) are still lower than transportation CIOs (at 27%). A higher percent of transportation CIO respondents indicate a longer list of barriers.

Some companies are breaking down barriers of culture by organizing social events to invite external parties to contribute to innovation (hackathons, trade fairs and technology shows, for example). Additionally, the number of innovation labs and startup initiatives such as Amadeus for Startups is increasing. Several airlines such as Lufthansa have set up an innovation lab separate from corporate to ideate on new travel designs such as Timepass and Flight Pass, which charges by the flight time and enables bulk ticket purchases.

Figure 8. Significant Barriers to Achieving CIO Objectives

Significant Barriers to Achieving CIO Objectives

Percentage of Respondents

	Transportation (n = 126)		Top Performers (n = 236)		Typical Performers (n = 2,437)		Trailing Performers (n = 285)	
1	Insufficient numbers of IT/ business resources	41%	Insufficient numbers of IT/ business resources	38%	Insufficient numbers of IT/ business resources	42%	Insufficient numbers of IT/ business resources	49%
2	Insufficient depth/breadth of digital skills	40%	Technology challenges blocking change	26%	Business culture blocking change	36%	Business culture blocking change	47%
3	Business culture blocking change	40%	Insufficient depth/breadth of digital skills	25%	Insufficient depth/breadth of digital skills	34%	Weak management under-standing of digital business	41%
4	Insufficient funding/budgets to pay for digitalization efforts	28%	Business culture blocking change	22%	Insufficient funding/budgets to pay for digitalization efforts	29%	Insufficient depth/breadth of digital skills	36%
5	Weak change leadership/ planning/execution	28%	Insufficient funding/budgets to pay for digitalization efforts	20%	Technology challenges blocking change	24%	Insufficient funding/budgets to pay for digitalization efforts	35%
6	Organizationally, we are not innovative enough	27%	Governance/oversight rules blocking change	18%	Organizationally, we are not innovative enough	23%	Organizationally, we are not innovative enough	35%
7	Technology challenges blocking change	27%	Business processes blocking change	16%	Weak management under-standing of digital business	21%	Weak change leadership/ planning/execution	26%
8	Weak management understanding of digital business	23%	Unable to source needed digital capabilities from vendors/contractors	13%	Business processes blocking change	19%	Weak management sponsorship of required change	25%
9	Business processes blocking change	22%	Organizationally, we are not innovative enough	13%	Weak change leadership/ planning/ execution	19%	Technology challenges blocking change	24%
10	Business structure blocking change	20%	Business structure blocking change	12%	IT culture blocking change	16%	Ineffectual relationships between IT and business	24%

Base: Total answering, excluding Don't Know; n varies by segment
Q: Which of these are the most significant barriers to achieving your objectives as CIO?
ID: 369007

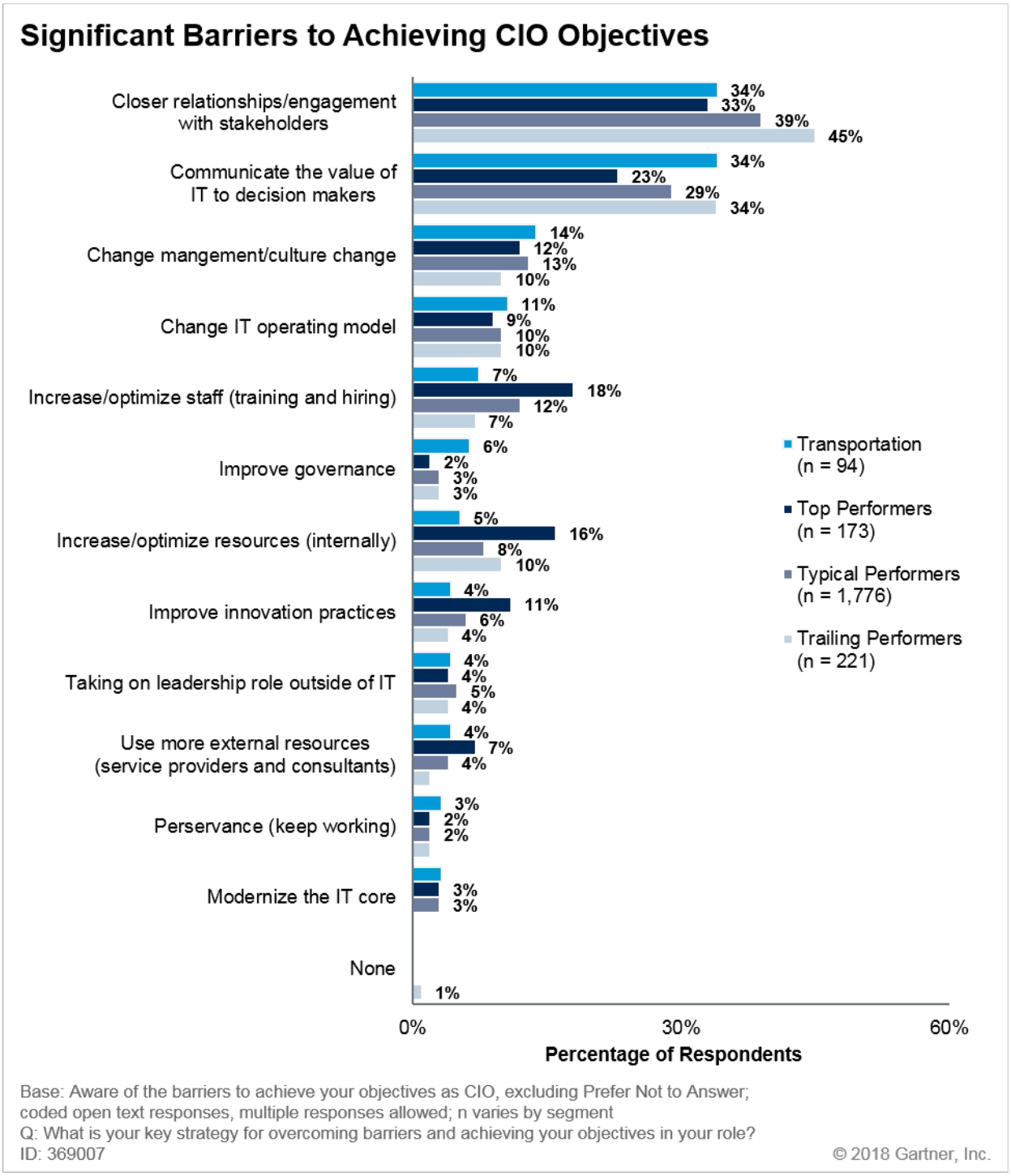
Data is from the 2019 Gartner CIO Survey.

Source: Gartner (October 2018)

Transportation CIOs recognize that, to break down the barriers of digital business objectives, it requires working with stakeholders across the organization and external to the organization. Transportation is fragmented in many countries, so it needs coordination across providers and also modes of transport.

Thirty-four percent of transportation CIO Survey respondents indicate that closer engagement with stakeholders is their strategy to achieve their objective (see Figure 9). An equal 34% of respondents indicate that their strategy is to communicate the business value of IT to the key decision makers. Research document “Six Barriers to Becoming a Digital Business, and What You Can Do About Them” offers tactical recommendations that transportation CIOs can use to remedy change.

Figure 9. Significant Barriers to Achieving CIO Objectives



Data is from the 2019 Gartner CIO Survey.

Source: Gartner (October 2018)

Recommendations for Transportation CIOs

- Illicit key performance indicators from key stakeholders to ensure your objectives align to the business priorities and metrics of the key stakeholders and decision makers. Aligned objectives will facilitate agreement faster.
- Create a compelling vision for the future state of transportation services and how your IT architecture and digital business technology platform will support this future state.
- Build the organizational capabilities and readiness needed to support digital business, on both the business and IT side. Work with the business to identify those capabilities, identify where gaps exist and create the roadmaps to fill them.

Methodology

The Gartner 2019 CIO Survey was conducted online from 17 April through 22 June 2018 among Gartner Executive Program members and other CIOs. Qualified respondents are the most senior IT leader (CIO) for their overall organization or a part of their organization (for example, a business unit or region). The total sample was 3,102, with representation from all geographies and industry sectors (public and private).

The survey was developed collaboratively by a team of Gartner analysts and was reviewed, tested and administered by Gartner's Research Data and Analytics team.

Additional Research Contribution and Review

Melissa Rossi Wood

Definitions

Table 1 provides definitions used in the 2019 Gartner CIO Survey. Table 2 provides the definitions used in the 2018 Gartner CIO Survey. The definitions are reflected in survey results shown in Figure 1.

Respondents answered the following question, which required a single response only: "Which of these best describes the stage of your organization's digital initiative — i.e., your organization's digitalization efforts?"

Table 1. 2019 Gartner CIO Survey Definitions

Ambition — Generate interest, excitement around digital business.
Design — Create a minimum viable product (product, service or business unit).
Deliver — Deliver a minimum viable product.
Scale — Scale up the business fully.
Refine — Optimize the digital business and seek new opportunities.
Not applicable — We do not yet have a digital initiative.

Source: Gartner (October 2018)

Table 2. 2018 Gartner CIO Survey Definitions

Desire/Ambition — We are engaging the overall organization, determining why we want to be a digital business and which overall business outcomes we seek.
Designing — We are determining specifically what digital business means for us and what our main capabilities will be (may have a Mode 2 or a pilot project up and running).
Delivering — We are implementing the changes needed to become a digital business (may have initial releases operational or used by a subset of customers/citizens).
Scaling — We are focused on scaling up the reach and impact of our digital business to a broad range of customers/citizens across multiple business lines/functions and with a wide range of outcomes.
Harvesting/Refining — Our digital initiative is mature, leading to an ongoing evolution of our offerings, and we are now harvesting the business benefits it is creating.
Not applicable — We do not yet have a digital initiative.

Source: Gartner (October 2018)

Gartner Recommended Reading

Some documents may not be available as part of your current Gartner subscription.

"2018 CIO Agenda: Transportation Industry Insights"

"2017 CIO Agenda: A Transportation Industry Perspective to Mastermind the Digital Ecosystem"

"A Digital Business Technology Platform Is Fundamental to Scaling Digital Business"

"Transportation Network Intermediaries Will Disrupt Smart Mobility"

"Hints and Tips on Using Gartner Numbers When Reviewing IT Spending Plans"

Evidence

This report is based on Gartner's annual survey of CIOs (see the Survey Objective and Methodology sections), which was conducted from 17 April through 22 June 2018. A total of 3,160 respondents participated, including 130 CIOs from the transportation industry. The respondents were members of Gartner Executive Programs and other IT leaders.

Note 1

The 2019 CIO Survey report segments respondents based on self-reported IT and enterprise performance. This segmentation allows a group of digital "leaders" to be identified as a best-practices group to contrast the performance of others. These three categories are:

- **Top performers —** A self-reported score of 6 or 7 (out of 7) on the question, "How effective is your company at making digital an integral part of business strategy and planning?" Also answered "scaling or harvesting" (the two top categories) as the stage of digital maturity to the question, "Which of these best describes the stage of your organization's digital initiative?"
- **Typical performers —** The cohort that performed too well to be included in trailing performers, yet not well enough to be included in top performers.
- **Trailing performers —** A self-reported score of 1 or 2 (out of 7) on the question, "How effective is your company at making digital an integral part of business strategy and planning?" Also answered "none or desired" (the two bottom categories) as the stage of digital maturity to the question, "Which of these best describes the stage of your organization's digital position?"

Note 2 Caveats With Year-Over-Year Comparisons

It may be dangerous to compare data from year to year due to potential differences in the constitution of the samples and because the exact phrasing of the questions can change. However, in this case, we believe there is value to share the data to put into context the state and stage of digital initiative efforts.

More on This Topic

This is part of an in-depth collection of research. See the collection:

- 2019 CIO Agenda: Industry Insights Overview

GARTNER HEADQUARTERS

Corporate Headquarters
56 Top Gallant Road
Stamford, CT 06902-7700
USA
+1 203 964 0096

Regional Headquarters
AUSTRALIA
BRAZIL
JAPAN
UNITED KINGDOM

For a complete list of worldwide locations,
visit http://www.gartner.com/technology/about.jsp