FEATURE

Enabling holistic decision-making to create a more intelligent network

The future of movement of goods

Joe Chmielewski, Michael Daher, and Ossama Ghazal

THE DELOITTE CONSUMER INDUSTRY CENTER

How can companies harness and harmonize data to continuously predict, optimize, and learn?

MAKING THE "RIGHT" decisions can often be more challenging than it should be. For companies to improve their ability to move goods across transportation networks, they should first recognize and then overcome institutional roadblocks from key stakeholders, legacy systems, and global logistics. Shipping organizations are now starting to embrace a shift to digitalize their largely physical world, power intelligent networks through cognitive technologies, and drive enhanced analytics. They are realizing that the tenets of holistic decision-making can create new supply chain efficiencies. In fact, the future movement of goods could very well depend on it.

In the initial article of our three-part series, *Creating a competitive supply chain advantage through connected communities: The future of movement of goods*, we described how we believe three interconnected pillars of strategic thinking can help drive the scope and pace of transformation in the transportation ecosystem.

Where the connected community pillar focuses on external elements, holistic decision-making is more internally focused. It centers on how companies with access to a connected community ecosystem can apply new data sources to make more effective decisions. Companies can then align resources to apply cognitive technologies, enhanced analytics, supply chain management, and modernization, and reap their benefits.

METHODOLOGY

Deloitte commissioned an online survey with 182 supply chain leaders operating across trucking, ocean, rail, manufacturing, and retail in early 2020. We supplemented this research with conversations with supply chain and industry leaders operating across multiple segments of the transportation value chain. The survey results, coupled with leaders' input, enabled segment-specific insights.
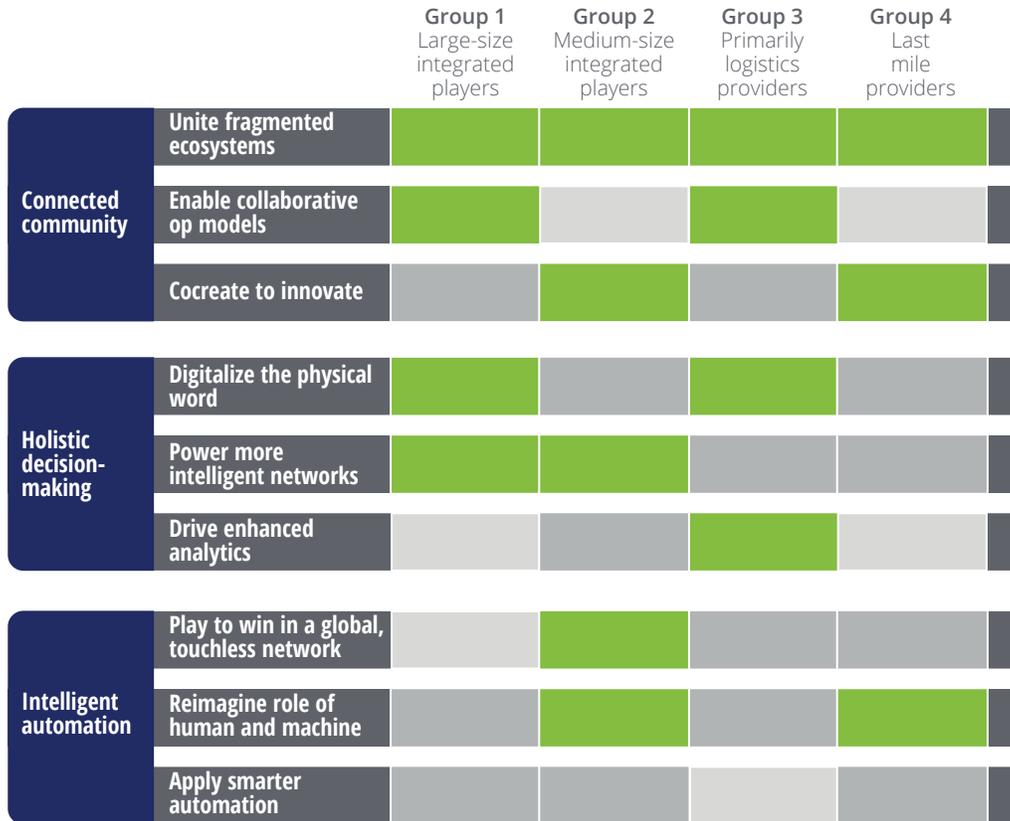
Holistic decision-making provides insights into how shipping organizations are undertaking a journey to digitalize the physical world and power more intelligent movement of goods networks through cognitive technologies. We focus on their ability to harness and harmonize traditional and new data to learn, optimize, and predict within the ecosystem. We also delve deeper into three success factors: digitalizing the physical world, powering more intelligent networks, and driving enhanced analytics (figure 1).

Of course, the maturity level of an organization matters. Adoption of these success factors varies, as companies prioritize them as low, medium, or high importance, depending on their place among ecosystem players. Overall, companies should do what's best for their organizations, aligning with the three pillars and their respective success factors as appropriate. Clearly, one size does not fit all.

FIGURE 1

Prioritization of success factors to help organizations succeed

■ High ■ Medium ■ Low

		Group 1 Large-size integrated players	Group 2 Medium-size integrated players	Group 3 Primarily logistics providers	Group 4 Last mile providers
Connected community	Unite fragmented ecosystems	High	High	High	High
	Enable collaborative op models	High	Low	High	Low
	Cocreate to innovate	Medium	High	Medium	High
Holistic decision-making	Digitalize the physical word	High	Medium	High	Medium
	Power more intelligent networks	High	High	Medium	Medium
	Drive enhanced analytics	Low	Medium	High	Low
Intelligent automation	Play to win in a global, touchless network	Low	High	Medium	Medium
	Reimagine role of human and machine	Medium	High	Medium	High
	Apply smarter automation	Medium	Medium	Low	Medium

Group 1: Large companies (>US$10B of revenue + >20% of market share) that offer land transportation and air cargo
Group 2: Medium-sized companies (>US$10B of revenue + <20% of market share) that offer land transportation and ocean
Group 3: Small companies (<US$10B of revenue) that primarily offer logistic services such as 3PL/4PL and freight forwarding
Group 4: Companies that offer last-mile delivery of packages either directly or via a network of local, nonprofessional couriers

Notes: High—To be prioritized within next six months; Medium—To be prioritized between six and 12 months; Low—To be prioritized after 12 months.

Source: Deloitte analysis.

Digitalize the physical world: Uncovering insights from new data sources

Global supply chains can be planned with great precision. However, unpredictable environments and rising consumer demands require unprecedented efficiency and agility to react to changing network conditions with dynamic decisions. Industry 4.0 technologies are creating new opportunities to digitalize the value chain and create sources of insight and opportunities to optimize networks in real time. How can companies take advantage of these opportunities?

Digitalization, enabled by Internet of Things or IoT (e.g., connected transportation, cargo, and warehouses) and external data sources

(e.g., weather, events, and traffic flows) can help with visibility into and optimization of shipping processes. Until now, tracking supply chain activity or a movement of goods happened in a very physical way, requiring manual data entry. Digitalization helps create real-time end-to-end shipment tracking and thus enables faster, better-informed decisions. Companies can optimize the flow of goods and make changes as needed to address a variety of conditions (e.g., weather, supply and production issues, and product availability).

In real-world terms, digitalization is effectively helping to track and trace shipments of the COVID-19 vaccine.[1] Transporters have greater visibility into where shipments are headed, when they're expected to arrive, who will receive them, when they were received, and, importantly, whether required temperatures were kept consistent throughout the shipping process. Another example is the launch of an innovative road transportation initiative by DHL where the company is looking to deploy more than 10,000 IoT-enabled trucks in India by 2028. Based on the testing phase, these trucks—enabled by IoT technology and data-driven insights for route optimization—will reduce the transit time by up to 50% vs. the traditional trucking industry. They will also provide more than 95% reliability with ease of use, end-to-end consignment visibility, temperature-controlled capabilities, and real-time tracking.[2] Companies utilizing instantaneous information can monitor and improve shipments by rerouting trucks, moving delivery warehouses, shifting personnel, or reallocating resources, among other options.
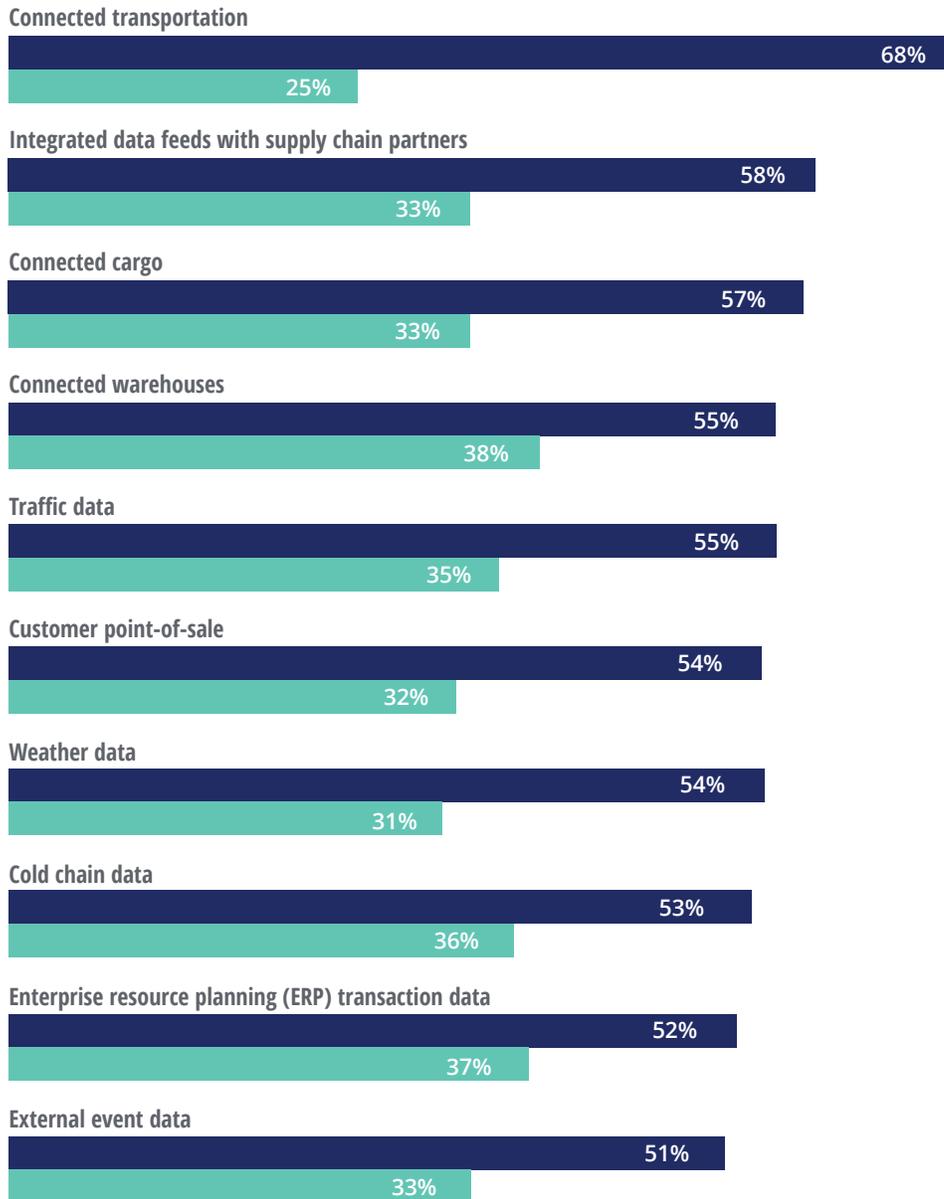
We are finding a growing maturity in this pillar. According to our survey, 81% of respondents currently are or planning to harness new types of datasets to improve analytics. We examined the types of data sources that shipping organizations are employing for stronger insights, control, and visibility into their supply chains, and where that data is helping global movers create value. Figure 2 shows that players are looking to find value across all types of data. We found that different segments are gravitating toward specific data sources. For example, large integrated players are more likely to be actively using end-to-end customer point-of-sale data, while last-mile providers gravitate toward employing traffic data and connected warehouses.

FIGURE 2

Types of data leveraged to drive new efficiencies

■ Actively using/piloting   ■ Plan to invest in the future

Connected transportation
68%
25%

Integrated data feeds with supply chain partners
58%
33%

Connected cargo
57%
33%

Connected warehouses
55%
38%

Traffic data
55%
35%

Customer point-of-sale
54%
32%

Weather data
54%
31%

Cold chain data
53%
36%

Enterprise resource planning (ERP) transaction data
52%
37%

External event data
51%
33%

Note: N=170.
Source: Deloitte Future of the Movement of Goods Survey.

Power more intelligent networks: Predicting, optimizing, and learning through cognitive technologies

New data streams are powering analytics and cognitive technologies. More intelligent networks enable organizations to reduce the time between collecting data and taking meaningful actions. By leveraging IoT and machine learning (ML), companies can gain advantage through such optimization in real time.

Once companies have digitalized their physical world and have real-time tracking of shipments in place, they can focus on how to take advantage of the benefits. So, what can a company do with all this information? Artificial intelligence (AI) or ML data, for example, can be leveraged to help optimize decision-making—potentially a key differentiator for a company in a competitive marketplace.

This applies to different supply chain functions, as well. For example, through real-time tracking, AI can help find an item stuck in the supply chain and offer route optimization to "unstick" it. If a delivery isn't progressing or something appears "off" in demand forecasting, an intelligent network can make alternate choices (e.g., more or fewer orders) on inventory management in real time. For

example, as part of its "Lightweight Inventory" strategy, Zara employs RFID technology on garment tags. The tags are activated when products enter a storage center and are deactivated when products are sold. This helps Zara understand the flow of products, automate the inventory management process, and obtain real-time data.[3]
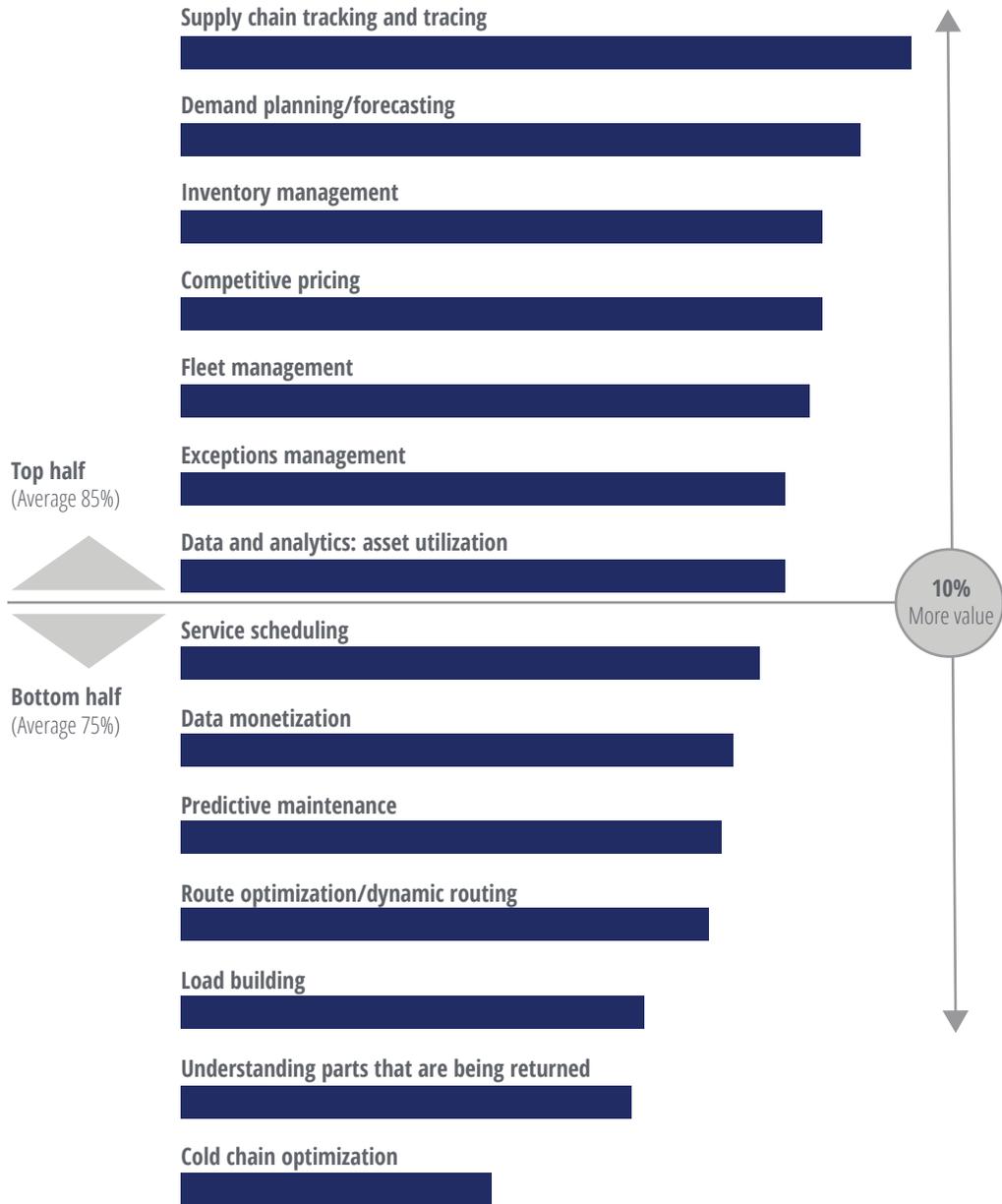
Early technology adopters provide a glimpse into tomorrow's higher-performing supply chains. Our research shows that AI and ML are among the key enablers that help optimize critical supply chain functions. For example, UPS developed the ORION algorithm, which is "a complex algorithm that could quickly solve complex routing problems." This dynamic routing program helps UPS "save about 100 million miles per year. That's a reduction of 10 million gallons of fuel consumed. It also reduces carbon dioxide emissions by about 100,000 metric tons."[4]

However, adoption of cognitive technology is still maturing. In fact, only 40% of survey respondents said they are actively using AI, which signifies that adoption of cognitive technologies still has a long way to go. Figure 3 shows that those players who adopt cognitive technology are looking to find value across all supply chain functions and capabilities. The top function (supply chain tracking) is 10% more likely to generate value for players than the bottom function (cold chain optimization).

FIGURE 3

Where data and analytics are driving value

■ Among survey respondents actively harnessing new data sources to improve analytics

Supply chain tracking and tracing

Demand planning/forecasting

Inventory management

Competitive pricing

Fleet management

Exceptions management

Data and analytics: asset utilization

Top half
(Average 85%)

Bottom half
(Average 75%)

10%
More value

Service scheduling

Data monetization

Predictive maintenance

Route optimization/dynamic routing

Load building

Understanding parts that are being returned

Cold chain optimization

Note: N=170.
Source: Deloitte Future of the Movement of Goods Survey.

Drive enhanced analytics: Enabled by IT modernization/ cloud, cyber risk management, and employee retraining and upskilling

Advanced analytics and real-time decision support are seldom turn-key solutions. Driving enhanced analytics capabilities requires coordination to modernize siloed organizations, legacy IT architecture, cyber safeguards, and talent requirements (retraining and upskilling).

For example, once a company implements and engages a state-of-the-art AI network, it can generate volumes of data that should be stored in the cloud. This, in turn, can expose the company to cyber risk. Also, new technology implementations will require staff training in these new technologies. Our research reveals that companies are already thinking about potential challenges. Just over four in 10 survey respondents cited investing in legacy IT to improve insights/analytics capabilities. Some organizations are leveraging significant analytical and computing capabilities in unique ways, including National Air Traffic Services (NATS) in the United Kingdom. NATS collaborated with Deloitte to develop Performance Optimizer, a fast simulation and predictive analytics tool for airspace analysis. The tool enables NATS to gain a deeper understanding of the capacity constraints and the likely outcome of a range of flow management measures available to the operations team. The tool leverages cutting-edge simulation engineering and data science capabilities to inform postoperations analysis. This enables users to quickly simulate "what-if" scenarios and evaluate the impacts of alternatives.

Our data also showed that 38% of respondents are looking to the cloud as datasets grow in complexity,

and similarly, 38% said they are taking steps to safeguard new data streams to prepare for cyber risks. From a talent perspective, organizations recognize the need to work with employees to prepare for looming changes. Some 81% are currently investing in—or believe they should invest in—employee training and upskilling to prepare to work with new analytics platforms.

IoT automation requires that all company resources, infrastructure, and people are part of a coordinated approach such that the full organization is tuned into the success factors of holistic decision-making. Enhancing analytics is especially important for organizations with large geographical footprints or those that have acquired companies. For example, advanced analytics and real-time decision-making cannot be limited to one link in the supply chain or to one area of the organization. So, widespread company geographies require a maturity scale to create a coherent strategy going forward. And upgrades should be handled companywide.

There are two potential roadblocks for organizations embracing this success factor: prioritization of resources and change management. First, from an organizational perspective, prioritizing resources, though vital, is potentially difficult for companies to overcome. Especially when it comes to driving enhanced analytics, organizations should align their efforts across the board—from IT updates to HR upskilling. Second, change management can be challenging. Because following this success factor will change how a company conducts business— from the physical to the digital. Empowering a company to adopt real-time decision-making AI and ML is not easy. So, managing change will likely be vital to success from an organizational perspective.

Conclusion: Harnessing and harmonizing data to continuously learn and predict

When it comes to overall capabilities, organizations should employ the right sets of tools, hire the right people, and promote the right leadership. Prioritization and planning are key and can help organizations embrace change.

Our survey found that nearly 80% of those executives we surveyed are currently investing in or planning to invest in holistic decision-making capabilities. However, we know that there is no one-size-fits-all solution—or even a set of solutions—that works for every organization. A lot depends on the size of the business and where an organization plays within the overall transportation supply chain ecosystem. As such, large integrated players will have different critical needs than logistics providers.

While digitalization is accelerating, we are still witnessing a growing digital divide. According to our research, 50% of large, integrated players are digitalizing the value chain and looking to new data sources for insights. This signals a growing maturity in this pillar. However, adoption falls significantly (13%) among smaller-sized players. In the end, as companies advance their operations toward a new normal, we believe they should consider connected community and holistic decision-making—as well as intelligent automation.

In our next article, we will investigate our final pillar, intelligent automation, where we will discuss how automation can create new opportunities for humans and machines to work together to help achieve the maximum value from holistic decision-making.

Companies should take the right approach to suit their organizational priorities. While the maturity of companies across each strategic pillar varies in the transportation ecosystem, it is imperative that the entire industry continues to harness and harmonize new and traditional data to continuously learn and predict what comes next.

FIVE STEPS TO MAKING MORE HOLISTIC DECISIONS

1. Evaluate company's cloud and data strategy

2. Assess cyber vulnerabilities and adjust strategy

3. Delineate internal capabilities and augment them with external support

4. Upskill talent to align with next-generation competencies

5. Enhance operating models to accommodate complexity of new roles

Endnotes

1. Reuters, "Online shipment tracking industry sees surge in business as COVID-19 vaccines arrive," *Business Today*, December 18, 2020.

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4. UPS Pressroom, "ORION backgrounder," accessed January 29, 2021.

Acknowledgments

About the authors

Joe Chmielewski | jchmielewski@deloitte.com

Joe Chmielewski is a managing director in Deloitte Consulting LLP's Transportation and Supply Chain practices. Chmielewski works with some of the largest organizations in the transportation sector, including airlines and logistics and distribution providers. He helps clients navigate shifting supply markets to drive value for their organizations. Chmielewski has led sourcing and procurement strategy development, category sourcing efforts, global operating model design, and large-scale transformation projects for some of the world's most recognized brands. He has deep experience in designing strategy and supporting operating models to manage global supply market complexity.

Michael Daher | mdaher@deloitte.com

Michael Daher is a principal in Deloitte Consulting LLP and currently leads the US Transportation practice, integrating services across Deloitte's multi-disciplinary portfolio of Advisory, Audit, Consulting, and Tax. Daher assists transportation clients grow, as well as manage costs and operational efficiency through large-scale, digitally enabled business transformation.

Ossama Ghazal | oghazal@deloitte.com

Ossama Ghazal is a senior manager in Deloitte Consulting LLP's Transportation, Hospitality & Services practice. With more than 10 years of experience, Ghazal has led large-scale transformation programs related to cost optimization and reduction, global operating model transformation and design, strategic sourcing, and digital procurement.

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Industry leadership

Michael Daher
US Transportation leader | Principal | Deloitte Consulting LLP
+ 1 212 313 1977 | mdaher@deloitte.com

Michael Daher is a principal at Deloitte Consulting LLP and serves as the US Transportation leader.

The Deloitte Consumer Industry Center

Stephen Rogers
Managing director | Consumer Industry Center | Deloitte Services LP
+ 1 475 277 9018 | stephenrogers@deloitte.com

Stephen Rogers is the managing director of Deloitte's Consumer Industry Center, Deloitte Services LP. He leads a team that conducts research to uncover new ways of thinking, working, and leading within the consumer industry through data- and evidence-driven analysis.

Rama Krishna V. Sangadi
Executive manager | Consumer Industry Center | Deloitte Services LP
+ 1 615 718 5029 | vsangadi@deloitte.com

Rama Krishna V. Sangadi is an executive manager with Deloitte's Consumer Industry Center. He has more than 15 years of experience in research and thought leadership activities related to retail and other consumer-facing industries.

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