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Travel, Logistics & Infrastructure

Digitizing mid- and last-mile logistics handovers to reduce waste

Three tech-based innovations have the potential to reduce waste at handover points along the logistics chain.

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Even in a well-oiled logistics chain, there can be significant waste. Much of it occurs around what can be called "blind handoffs"—when two (or more) parties are involved in the handover of goods on their journey between manufacturers, warehouses, retail stores, and consumers' homes. These points are where costly miscommunication, loss of information, and delays are most likely to happen. McKinsey analysis finds that between 13 and 19 percent of logistics costs could stem from these inefficient interactions, amounting to up to $95 billion in losses a year—in the United States economy alone.

Until now, the most common approach taken by shippers and carriers to reduce waste has been to increase visibility across their logistics chains by adopting real-time transportation visibility platforms (RTTVP). The market for these solutions has expanded rapidly; startups offering visibility solutions have attracted around $7 billion in funding since 2022.[1] This gives some sense of the industry's appetite for waste reduction. While visibility is essential, perhaps more can be done to address the handover points where waste happens, for instance by finding ways to make coordination and communication seamless when goods need to change hands.

Technology companies, shippers, and carriers have been working to develop software that streamlines coordination and communication. Apart from RTTVP, two other types of solutions have emerged: AI-based workflow automation, and generative AI-driven contextual communication. Our analysis suggests that a combination of these three innovations, implemented appropriately, can reduce waste caused by blind handoffs by up to 40 percent.

Of course, technology alone may not be enough to achieve such a significant reduction. Getting it right will likely require companies to measure the extent of their handover losses, find ways to integrate the relevant solutions within their existing operating models and tech stacks, and build new digital capabilities before they reap the benefits.

Both B2B and B2C carriers stand to benefit the most from addressing blind handoffs, and success stories exist of such companies reducing their operating costs by doing so. This article reviews the three emerging solutions and draws on best practices that can be applied, specifically in middle- and last-mile logistics. It does not address first-mile or intermodal logistics, which are the focus of our ongoing research into other parts of the logistics value chain.

While the research behind this article is specific to the United States, the themes it uncovers are applicable to logistics globally.

Waste: how it happens, what it costs

Blind handoffs happen at multiple points across the logistics chain, spanning B2C and B2B deliveries. Based on our research, we estimate that in the US, the value of all middle- and last-mile deliveries of e-commerce, food and beverage, and consumer retail and packaged goods by road came to around $485 billion in 2021 (Exhibit 1).

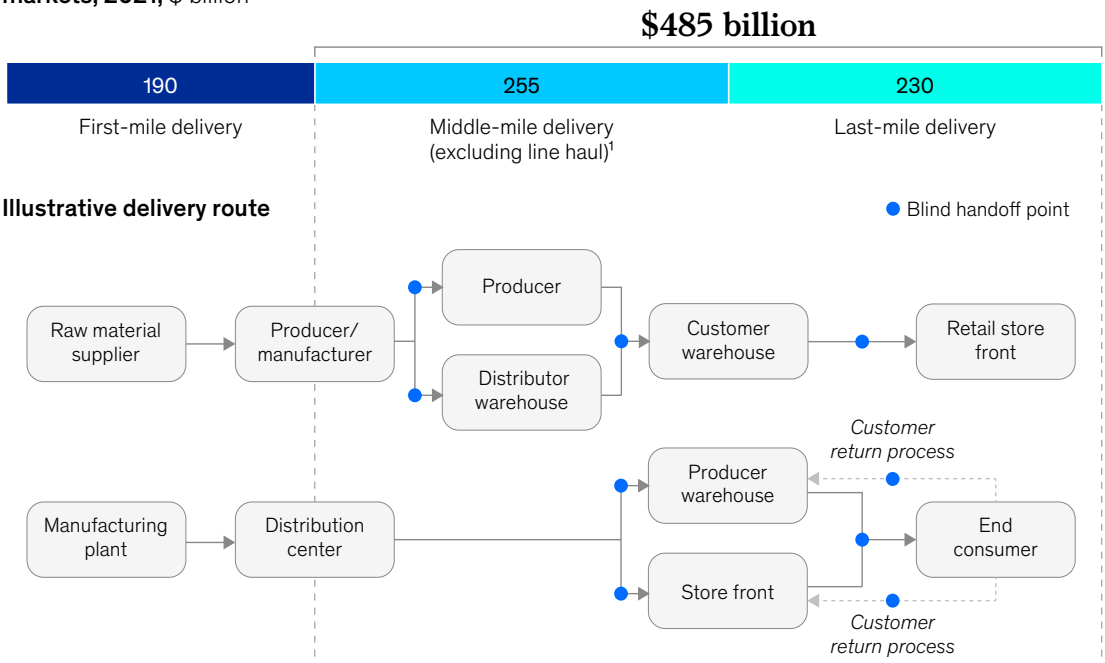
Within this value pool, between $65 billion and $95 billion of waste is generated at interaction points between shippers, dispatchers, third-party logistics companies (3PLs), and carriers at the time of delivery. Most of these losses affect B2B companies, likely between $45 billion and $66 billion a year. Losses for B2C interactions may total $18 billion to $28 billion a year, mainly driven by the costs of dwell time.[2]

[1] McKinsey analysis of data from: CB Insights; Crunchbase; and Pitchbook.
[2] McKinsey analysis of data from: American Trucking Association; Armstrong & Associates; Bloomberg; Freight Analysis Framework, United States Bureau of Transportation Statistics; Freight Waves; Statista; US Census; and US Department of Transportation (Bureau of Transportation Statistics).

Exhibit 1

The US market where blind handoffs can occur is worth $720 billion; mid-mile and last-mile account for $485 billion.

US trucking and road parcel industry value for e-commerce, retail, CPG, and food and beverage markets, 2021, $ billion



[1]Line haul is defined as warehouse-to-warehouse freight. It is part of middle-mile delivery but does not include two or more parties, so it was excluded from the analysis. Line haul was estimated at $45 billion in 2021.
Source: Armstrong & Associates; US Census; US. Department of Transportation (Bureau of Transportation Statistics); American Trucking Association; Statista; Freight Analysis Framework; Freight Waves; Bloomberg; McKinsey analysis

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Waste is made up of direct and indirect costs.[3] Direct costs include:

— **Communication.** For B2C carriers, direct communication costs account for up to 0.5 percent of revenue. Losses are accrued through the roughly 6,000 customer service agents in the US who are fully dedicated to logistics issues.[4] Around 70 percent of their time is spent resolving problems caused by blind handoffs. Meanwhile, B2B carriers have around 50,000 dispatchers altogether.

[3]Figures on the costs associated with blind handoffs are the result of McKinsey analysis of data from the following sources: "Ranking of ecom product brands in the US in 2022," Affinity Solutions; "2022 Annual report ," Amazon; "Comparing The Cost Of Shipping Insurance," Cabrella shipping insurance, July 2, 2019; "2023 U.S. B2B E-commerce market report," Digitalcommerce360, February, 2023; Freight Analysis Framework, United States Bureau of Transportation Statistics, August 28, 2023; Statista; "More than 1 in 10 packages 'disappear without explanation' in major US cities, and it's a huge headache for retailers," *Business Insider,* Dec 3, 2019; *The final 50 feet urban goods delivery system: Common carrier locker pilot test at the Seattle municipal tower,* University of Washington Supply Chain and Logistics Center, October 2018; John Gallagher, "Are drivers wait times nullifying carrier pay increases?" FreightWaves, October 20, 2021; "Dock delays and detention are a big issue," Trinity Logistics, November 17, 2021.
[4]Assuming total number of customer service representatives in consumer goods companies in US is roughly 430,000; 1–2 percent of customer service representatives are fully dedicated to logistics issues, including scheduling, route optimization, and delivery problems escalation.

Similarly, 70 percent of their time is dedicated to issues caused by blind handoffs.

— **Detention or dwell time.** For B2C carriers, this amounts to 3 to 5 percent of revenue. The costs accrue through 160 million hours spent in dwell time per year.[5] Between 1 and 1.5 hours are spent in avoidable dwell time every day.[6] And, in B2B, 850 million hours are spent in detention or dwell time each year.[7]

— **Lost and stolen packages.** For B2C carriers, 23 billion packages are delivered every year in the US, of which 1.5 percent are lost or stolen in last-mile deliveries.[8] In B2B, 0.1 percent of shipments are lost or stolen in middle- and last-mile deliveries in the US.[9]

— **Re-deliveries.** For B2C carriers, this accounts for 1 to 3 percent of revenue; 10 percent of packages delivered in last-mile logistics need to be re-delivered.[10] The cost of re-delivery is negligible in B2B.

These issues also lead to indirect costs, specifically from customer dissatisfaction and low re-ordering rates. Customer dissatisfaction tends to spike when customers experience delivery issues. In fact, 88 percent of consumers abandon their online shopping carts due to poor shipping terms, and 85 percent say they will not shop with a retailer again after having a poor delivery experience.[11]

Other indirect costs include driver dissatisfaction, the environmental impact of fuel wasted during dwell time and re-delivery, and productivity loss through inefficient vehicle use and operational issues in warehouses and processing centers.

Costs impact carriers the most, relative to shippers or any other participant in the value chain (Exhibit 2). All in all, the total cost of waste at blind handoffs likely accounts for between 6 and 13 percent of carriers' overall revenue.[12] Even if the customer is not directly responsible for any of the costs, they will ultimately bear the burden through price increases and wasted time. Collectively, according to our analysis, US customers could spend hundreds of millions of hours a year tracking misplaced packages.

A successful handoff requires four capabilities: consistent processes with an easy-to-use platform; real-time collaboration and communication; seamless cross-party communication; and minimum personnel time.

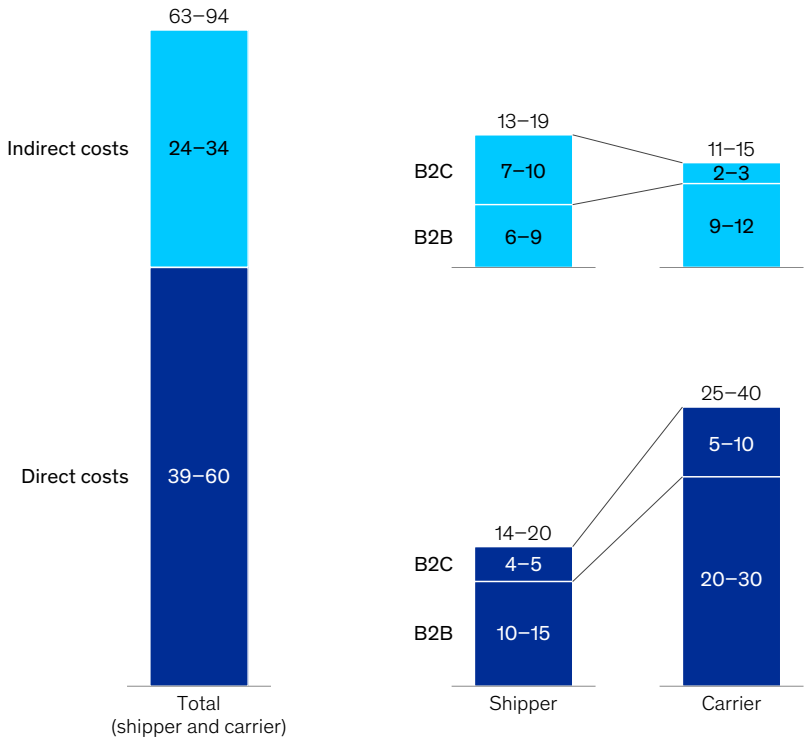
However, our work with logistics companies reveals that the most widespread methods for communication and coordination in logistics do not fully address these capabilities. The most common communication method is text messaging back and forth between two parties at a time, resulting in reactive updates for shippers. On the plus side, text messaging incurs relatively low costs which are often subsidized by carriers. However, there is little real-time collaboration and cross-party communication. A notable disadvantage is this method's high requirement for in-person engagement and its possible impact on driver safety. Its chief advantage is its easy-to-use platform.

[5] Assuming 0.1 billion shipments per year, 100 stops per truck per day, 10 percent of stops with 12 minutes dwell time.
[6] Assuming 100 stops per truck per day, 10 percent of stops with dwell time of 12 minutes per stop.
[7] Including 0.4 billion hours spent in paid detention time and 0.8 billion hours spent in non-paid dwell time; dwell time is an opportunity loss for 3rd party carriers and accounts for $6 billion revenue losses in the US for logistics providers; including 30 percent reductions for dwell time not related to blind handoffs e.g., paperwork, congestions.
[8] Around 0.62 billion packages are lost and stolen annually on last mile, assuming 50 percent of losses are due to blind handoffs and that 75 percent of packages are insured for B2C for $0.7 per $100 value.
[9] Assuming 100 percent of packages are insured for B2B for 0.7 per $100 value.
[10] Approximately 15 percent of deliveries in the US are subject to re-delivery; assuming 5 percent are related to damaged packages and 10 percent to blind handoffs.
[11] Komal Puri, "The last mile mandate: Key insights from a U.S. consumer survey," *FarEye,* October 13, 2022.
[12] Figures are the result of McKinsey analysis of data from the following sources: "Ranking of ecom product brands in the US in 2022," Affinity Solutions; American Trucking Association; Freight Analysis Framework, United States Bureau of Transportation Statistics; Major market FTL and LTL logistics companies' annual reports.

Exhibit 2

Direct and indirect costs of blind handoffs could total $63 billion to $94 billion a year; carriers bear the greatest loss.

Potential losses due to blind handoffs, $ billion



Source: Statista; Congressional Budget Office "Emissions of Carbon Dioxide in the Transportation Sector"; US Bureau of Labor Statistics; Statista; Gartner; Business Insider; US Energy Information Administration (www.eia.org); McKinsey analysis; expert interviews

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The next-most common method is conducting multiple phone calls between two parties at a time, also resulting in reactive updates for shippers. Similar to texting, advantages include relatively low costs and a platform that is easy to use. Disadvantages include the fact that communication can happen between only two parties at a time and that making phone calls could have implications for driver safety.

A more recent method, with less uptake, involves using multiple delivery-management apps to coordinate between parties. These provide real-time updates, giving shippers periodic information through emails or tracking links.

This method has low usage and relatively high costs (between $20 and $45 per driver). While the sharing of some information is automated, this method still requires high in-person engagement. It facilitates real-time collaboration, but the platforms are relatively difficult to learn and use, and imperfectly provide for cross-party communication.

Three software-based innovations can reduce waste

New and emerging software-based solutions exist that can provide the capabilities needed for successful blind handoffs. Since 2012, these

solutions have attracted a collective $12 billion in investments.[13]

Real-time transportation visibility platforms
The chief function of RTTVPs is to provide visibility on logistics. This is done by using Advanced Programming Interface (API) integrations, real-time tracking, and predictive analytics. RTTVPs are facilitated by delivery management platforms, such as applications for drivers to plan and execute deliveries. Key contributions include providing transparency and visibility at every stage of delivery, optimizing previously inefficient routes, and the ability to manage customer expectations by giving them a near real-time view of their shipment's location at any given time.

Currently, RTTVP is the best-established solution in the market, with 178 companies based in the US that provide such platforms. Analysis indicates that around 80 percent of carriers in the US have adopted some form of RTTVP.

AI-based workflow automation
These emerging solutions focus on simplifying complex logistics scheduling and optimizing routing. Some also provide a digital co-pilot for customer service representatives. For example, an AI-based co-pilot could send alerts, address questions, and proactively adjust routes as issues occur.

AI-based workflow automation is newer to the market than RTTVPs, with 53 companies based in the US that provide these solutions. Since 2012, innovations in this category have attracted $2.9 billion in investments.

Generative AI-driven contextual communication
These solutions are the most recent disruptive innovation. This category has received $1.7 billion in funding since 2012 and includes 13 US-based companies. These solutions tackle delivery challenges by building contextual understanding around deliveries and involving all parties through real-time simultaneous communication. Key contributions of this technology include understanding context; reducing miscommunication between shippers, carriers, and recipients; providing autonomous agents to improve the efficiency of customer service agents; and reducing manual intervention from drivers and dispatchers which is the current paradigm.

Several logistics companies are currently using one, or more, of these solutions, and seeing results (see sidebar, "The transport and logistics company, Ryder, achieved major improvements in efficiency and customer satisfaction by investing in tech-based innovations").

Combining solutions to increase impact

The impact of solutions to blind handoffs varies according to the business model of the company adopting them, fleet size, and their specific needs and challenges. While each solution has standalone value, companies could use them in combination to enhance the capabilities they provide—and increase the benefits the company is likely to see.

As RTTVP is the most mature of these innovations, this could be a good place to start for companies setting out on implementing new technology to improve blind handoffs. However, most logistics companies already have some form of RTTVP in place. A McKinsey survey of more than 250 logistics firms in May 2023 found that tools supporting real-time visibility and telematics for fleet management have seen above-average adoption and investment rates.[14]

Once tools that give visibility are in place, companies could complement and enhance their capabilities by using AI to automate some

[13] Figures on the markets for digital innovations are the result of McKinsey analysis of data from: CB Insights; Crunchbase; and Pitchbook.
[14] "Digital logistics: Technology race gathers momentum," McKinsey, November 16, 2023.

The transport and logistics company, Ryder, achieved major improvements in efficiency and customer satisfaction by investing in tech-based innovations

Ryder upgraded its technology to provide customers with self-scheduling delivery and real-time visibility and notifications in its RyderView platform. Combined with enhanced business intelligence and analytics, the new system helped to reduce costs while streamlining operations and boosting customer satisfaction.

The company invested in real-time track and trace capabilities to provide visibility on deliveries to all stakeholders, including shippers, carriers, drivers, and end customers. These capabilities are enhanced by self-service scheduling. The new system also enables the sending of notifications—for example, sharing reminders, photos, and other information relevant to deliveries. These innovations have had a tangible impact on Ryder's operations. The system allows Ryder to project and communicate a two-hour window within which customers could begin to receive packages, making it easier to plan for deliveries. It also provides options for different time windows per day. And customers are showing their appreciation with higher customer ratings.

processes and, sequentially or in tandem, use gen AI solutions too, for instance as add-on solutions for drivers. Some visibility companies are moving toward adding these components to the platforms they provide.

For carriers, combining these solutions could reduce direct costs by 35 to 40 percent and reduce indirect costs by 25 to 45 percent (Exhibit 3).

The tech-based innovations themselves may not be enough to realize maximum value—the technology alone is not a panacea. Appropriate change-management practices around implementation are indispensable for realizing the potential of tech upgrades.

Carriers and shippers are beginning to adopt these innovations, but there is still value to realize. Companies may struggle to implement these solutions due to a lack of strategic alignment, lack of required capabilities, or insufficient adoption at scale. Companies considering tech adoption could look to these as potential next steps on their journey to reduce waste:

— **Develop strategic alignment.** This involves an assessment of how much value is at stake and the efficiencies that could be realized through new technology. A key enabler for logistics carriers and shippers may be understanding current operations and then embarking on change management including training personnel and outlining expectations of future operating procedures.

— **Achieve adoption at scale.** This may require companies to design and use an implementation roadmap incorporating appropriate change-management practices to guide the tech transformation. A big-bang approach, considering the disparate operations and personnel involved, could be risky. Taking a phased approach, and aligning any changes with the existing operating model, could set tech adoption up to succeed.

Exhibit 3

Combining all three software innovations may have the greatest impact.

Direct costs: Potential reduction of 35–40%

RTTVP[1] full-potential | Additional value

Innovation archetypes	Cost of communication	Cost of dwell time	Cost of redeliveries	Cost of lost and stolen packages
1. **RTTVP** solutions unlock value	**10–15%** decline in customer service intervention for B2C **5–10%** decline in hotline calls for B2B	**15-20%** reduction in median dwell time for B2B and B2C	**5–10%** reduction in redeliveries for B2C	**5–10%** reduction in refunds for lost and stolen packages for B2B and B2C
×2				
2. **AI-based work-flow automation** enables full potential of RTTVP	***Can double the value from RTTVP solutions*** *by optimizing routing, dispatching, tracking*			
+				
3. **Communication redefinition** adds further value	**15–20%** decrease in resolution time for B2C **10–15%** decrease in resolution time for B2B	**20–25%** reduction in dwell time for B2C **5–10%** reduction in dwell time for B2B	**20–25%** reduction in redeliveries for B2C	**15–20%** reduction in refunds for lost and stolen packages for B2C
Total B2C	**35–50%**	**50–65%**	**30–45%**	**25–40%**
Total B2B	**20–35%**	**35–50%**	***Insignificant***	**10–20%**
			Recipient's response rate is the key driver for these issues which can be improved significantly by seamless, fast communi-cation with the driver and shipper	

Indirect costs: Potential reduction of 25–45%

Innovation archetypes	Cost of driver dissatisfaction[2]	Cost of product substitution	Cost of incremental emissions	Cost of productivity loss
1. **RTTVP** solutions unlock value	**10–15%** reduction of drivers' turnaround for B2C **5–10%** reduction in drivers' turnaround for B2B	**15–20%** drop in returns for B2C **10–15%** improve-ment in net promoter score (NPS) for B2B	**10–15%** reduction in fleet miles for B2C **10–15%** reduction in fleet miles for B2B	**10–15%** improvement in fleet utilization **75%** increase in warehouse productivity for B2B[5]
×2				
2. **AI-based work-flow automation** enables full potential of RTTVP	***Can double impact from RTTVP solutions*** *by optimizing routing, dispatching, tracking*			
+				
3. **Communication redefinition** adds further value	**15–20%** reduction of drivers' turnover for B2C **10–15%** reduction of drivers' turnover for B2B	**15–20%** drop in returns for B2C[3]	**10–15%** reduction in fleet miles for B2C[4]	**10–15%** improvement in fleet utilization[6]
Total B2C	**35–50%**	**45–60%**	**30–45%**	**30–45%**
Total B2B	**20–35%**	**20–30%**	**20–30%**	**100%**

[1]Real-time transportation visibility platform. [2]Impact on 1 hour of dwell and detention time equals impact on drivers' dissatisfaction losses. [3]Assuming same level of improvement as with RTTVP due to better communication in last mile and better ETA. [4]Assuming emissions from redeliveries reduced proportionate to redeliveries optimization; No extra emissions from dwell for B2C as drivers either pay for fuel themselves or have fuel spending parameters. [5]Enhanced visibility and improved communication can lead to reduced waiting, picking, and handling times, resulting in a potential 3-5% reduction in warehousing costs. [6]Dwell time unblocked with communication redefinition can be transferred to extra deliveries.
Source: Experts inputs; company success cases; McKinsey analysis

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— **Build capabilities.** Companies can create a tailored approach, accounting for existing complexities unique to their context. Shippers and carriers may consider setting KPIs for milestones and impact such as reduced dwell time for drivers, or improvement in driver experience.

The problems caused by blind handoffs are worth solving as they can cost the logistics industry up to $95 billion a year in wasted time and resources. Logistics operators have begun exploring tech-based solutions to these problems resulting in a rapidly expanding market for such solutions.

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