

Reskilling Logistics: Future-Proofing the Workforce for AI-Driven Supply Chains

How Logistics Leaders Can Close Skills Gaps, Boost Operational Reliability, and Maximize Their Automation Investments.

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Executive Summary

A strategic blueprint for logistics leaders to turn workforce reskilling into an operational advantage, unlock automation ROI, and build future-ready supply chains.

AI, automation, and predictive platforms are the operational backbone of logistics. From autonomous warehouses to intelligent dispatching, the industry is undergoing a real-time transformation. But across every tier of the supply chain, one critical vulnerability threatens to stall this progress: a widening workforce skills gap.

While technologies evolve at breakneck speed, the teams tasked with using them are often left without the training or context to keep pace. The consequences are tangible: slower adoption, higher error rates, underperforming systems, and missed returns on major tech investments.

This white paper offers a practical, evidence-backed roadmap for logistics decision-makers ready to confront that gap. Drawing on insights from Deloitte, the World Economic Forum, logistics case studies, and peer-reviewed research, it outlines:

- How skills misalignment undermines even the most advanced logistics systems
- What reskilling strategies deliver real operational ROI and which fall flat
- How to overcome common barriers like executive inaction, frontline skepticism, and poor rollout timing
- And why future-ready workforce development is just good governance and smart business

The table below covers the five core challenges and how this paper addresses them...

From Pain Points to Practical Action

Challenge	Evidence	Strategic Response
Workforce skills are lagging behind rapid tech adoption in logistics	Teams lack training for AI systems, resulting in slower adoption, underused platforms, high error rates, and missed ROI	Treat workforce reskilling as a core operational strategy, not an afterthought
Leadership often delays or underfunds workforce development initiatives	Executive inaction and poor rollout timing lead to implementation setbacks and organizational resistance	Build reskilling into tech rollout plans and secure leadership commitment early
Frontline skepticism and cultural resistance undermine new systems	Skepticism grows when training is misaligned, irrelevant, or delivered too late	Deploy tailored, role-specific, just-in-time reskilling programs that integrate with daily workflows
Hiring alone can't keep up with tech-driven workforce needs	Constant churn, long ramp times, and skill mismatches limit the impact of external hires	Invest in internal reskilling pipelines that reduce turnover and speed up tech adoption
Companies struggle to prove ROI from workforce development	Leaders lack metrics, benchmarks, and visibility into reskilling outcomes	Use operational KPIs to track training impact and make workforce investments measurable

In a sector defined by speed, accuracy, and volatility, workforce readiness is no longer a soft metric.

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Introduction

AI is reshaping and rebuilding logistics. And workforce readiness is the critical variable.

Autonomous warehouse systems, predictive dispatching, intelligent load planning, and real-time supply chain visibility tools are quietly redefining how freight moves, decisions are made, and how logistics firms stay competitive. This isn't news, you live it.

But as the pace of technology accelerates, a quieter breakdown is occurring on the ground. Frontline workers are being asked to navigate complex systems without the training, tools, or context to do so effectively. The result? Underused platforms. Rising error rates. Missed ROI benchmarks. And teams uncertain about where they fit in the future of the industry.

This paper argues a central truth:

In AI-driven logistics, reskilling is a core operational strategy.

Companies that delay workforce development until after tech rollout are already seeing the costs: implementation setbacks, stalled automation, fulfillment delays, and customer dissatisfaction. The problem isn't the technology, or lack thereof, it's the absence of enablement.

By contrast, forward-thinking firms are embedding continuous learning into operations. They're deploying reskilling programs that move at the speed of tech. They see faster onboarding, fewer fulfillment errors, and stronger team retention in high-turnover environments.

This white paper provides logistics leaders with a hands-on playbook for closing workforce skill gaps and turning talent development into a strategic edge. It includes:

- **A field-level look at the business impact of skills misalignment**
- **Targeted, logistics-specific reskilling strategies**
- **Blueprints for measuring ROI in operational terms**
- **A breakdown of why reskilling outperforms hiring and what to do next**

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Backed by more than a dozen studies and industry insights, this report offers not just the “why,” but the “how.” In today’s logistics landscape, the biggest risk isn’t investing in workforce development too little and too late.

The AI Disruption Is Already Reshaping Logistics

AI disruption in transportation and logistics is not some hyperbolic theory, but a concrete operational fact. Across warehousing, dispatch, and supply chain management, automation and intelligent systems are redefining how freight moves, how fulfillment is executed, and how companies compete. Leaders who view reskilling as a distant concern, or quite possibly worse, delegated to a second-tier training program and consider it done, risk being outpaced by competitors who recognize that workforce transformation is sacrosanct.

Transportation and logistics are not merely adopting AI in droves; they are being rebuilt around it. Automated warehouses, AI-powered dispatching, and predictive supply chain platforms are shifting from pilot phases to core infrastructure. As one study notes, “automation is replacing manual and repetitive tasks and low-skill work tasks in general,” a shift that fundamentally alters the role of frontline workers (Karakikes et al., 2025, p. 2985). AI is taking root in the daily mechanics of logistics, transforming both how work is performed and who is equipped to perform it. As roles shift and technological fluency becomes the new vernacular, swaths of the workforce become measurably more valuable. A reality this paper will quantify in concrete terms.

Yet transformation is progressing unevenly. A 2023 cross-sector study of transportation leaders revealed stark differences in the pace of automation across transport modes and exposed workforce vulnerabilities in certain job categories and demographics (Polydoropoulou et al., 2023). Some sectors, like air freight and intermodal logistics, are rapidly scaling AI-enabled planning systems, while others remain anchored in analog routines. The study highlighted that older workers, lower-skilled roles, and under-resourced departments are at the highest risk of being left behind. These gaps reflect organizational inertia and cultural hesitancy to change frontline roles. As a result, automation gains are clustered unevenly, creating internal disparities that compound over time.

In shipping and port logistics, for example, Carlan and Vanelislander (2021) found that despite wide discussion of AI adoption, implementation remains sluggish, hampered by legacy practices. Email chains, PDFs, and manual data re-entry still dominate workflows, creating what the authors call an “opening scene for extra labor, misinterpretation, or faults.” Human workers must manually rekey data into enterprise systems, which is something that AI is well positioned to eliminate. This unevenness is a considerable management challenge. Inconsistent adoption across modes and departments leads to the kind of operational fragmentation guaranteed to deliver less than full ROI.

Digitalization has enabled real-time data use and optimization across transport operations, but implementation barriers remain. “Digitalisation has led to changes in the skills and tasks required of transport workers,” especially as companies shift to data-driven decision-making and

AI-supported systems (Karakikes et al., 2025, p. 2985). These changes are not limited to back-office functions; they extend to frontline roles in dispatching, routing, maintenance, and load planning, where real-time responsiveness is now expected.

At the same time, adoption has been inconsistent. While some firms leverage AI in strategic planning, route optimization, and warehouse automation, only 1% report achieving full automation across their operations (Deloitte, 2024, p. 6). This patchwork approach reflects a deeper problem: AI is being treated as a tool to optimize individual functions rather than as a catalyst to reimagine end-to-end operations. Without an integrated strategy, early investments often stall before delivering meaningful returns. Most remain stuck in what Deloitte calls the “shallow adoption” phase, where piecemeal deployment and siloed pilots have failed to deliver transformative impact (Deloitte, 2024, pp. 6, 22).

This gap between technical possibility and organizational reality is becoming increasingly urgent. Firms that fail to scale beyond fragmented adoption face compounding challenges: rising operating costs, underused technology investments, and growing pressure to modernize from customers and supply chain partners. As digital systems mature, the competitive divide is no longer between adopters and laggards; it's between firms that can integrate AI seamlessly into daily workflows and those that cannot.

How AI, Automation, and Digital Platforms Are Becoming the New Operational Core

The shift to AI isn't limited to high-level strategy decks. It is quietly reshaping the day-to-day decisions and redefining from the inside out. What's changing now is AI's level of autonomy and its ability to handle decisions in real time.

As Karakikes et al. (2025) explain, “the advent of new technological applications and the focus on limiting human error have propelled the penetration of both automation and digitalisation across transport modes... including shipping, where autonomous vessels have been constructed already with the potential of totally crewless sailings” (p. 2986). This high-level trend is now playing out in logistics operations across every tier of the supply chain. The industry is building around it.

AI and automation are now operational staples in logistics. Inside modern warehouses, robotics systems handle everything from inventory picking to packing and sorting, often with limited human oversight. AI-driven Warehouse Management Systems (WMS) orchestrate storage optimization, labor allocation, and real-time order fulfillment. As Nugroho (2025) observes, “through computerization and information systems, industry players can manage and track the flow of goods more efficiently, improve coordination with business partners, and provide stakeholders with more accurate and timely information.” On the roads, dynamic routing

platforms adjust delivery paths based on live traffic, weather, and loading conditions. This asset is cutting fuel costs and improving on-time performance. In the control tower, predictive analytics models forecast inventory needs, detect disruptions before they occur, and recommend proactive interventions to avoid downtime. This means that strategy meetings now rely on dashboards instead of gut instinct, and fulfillment planning integrates live metrics rather than post-mortem reports.

These systems are no longer fringe tools. “Leaders” in logistics are using AI to build digital-first operations, revamping legacy systems, integrating near real-time visibility, and connecting supply chains through analytics and simulation (Hong & Allgood, 2024). As the authors describe, next-gen strategies involve combining big data, advanced analytics, and GenAI with “digital twins of supply chains” to optimize value chains end to end.

But while the top performers are accelerating, the rest of the industry is struggling to keep pace. The gap between innovation leaders and everyone else is growing, and it's an execution gap rooted in people, training, and culture.

Yet scaling remains a challenge. As Deloitte (2024) notes, “transportation companies seem to be struggling to scale, as just one in five surveyed have matured to broad implementations” (p. 6). These gaps are often less about technology and more about workforce readiness. Having the tools is no longer enough. You need skilled teams who can deploy, interpret, and evolve alongside these systems, not just the tools.

Still, digital maturity is uneven. Even within the same firm, first- and middle-mile operations often lead on AI adoption, while departments like finance, HR, and frontline productivity lag far behind (Deloitte, 2024, p. 7). And as Nugroho (2025) warns, “many workers lack the necessary skills to operate automated systems, AI-driven logistics management platforms, and data analytics software.” This uneven acceleration creates communication breakdowns, fragmented workflows, and causes key functions to drift out of sync. The result is a dual-speed organization with one part optimized, the other unprepared, and neither knows nor understands what the other is doing.

The implications are not just technical, but human. Adio et al. (2025) describe this shift as a “paradigm change,” one that demands new HR strategies, clear upskilling pathways, and transparent conversations about privacy and job security (p. 612). As outlined earlier, along with the tools, the frontline needs trust, clarity, and a voice in how this unfolds. Without these, digital tools risk creating disconnection and distrust.

The potential of AI lies in its ability to amplify other technologies. As Nugroho (2025) explains, AI acts as the “analytical engine” powering broader Industry 4.0 (Fourth Industrial Revolution) innovations from blockchain to drones by processing structured and unstructured data at scale. It doesn't replace tools like WMS, RPA, or IoT; it multiplies their value. RPA systems, when paired with AI, enable predictive forecasting and real-time warehouse optimization. In DHL's

case, this fusion helped redeploy half the manual workforce, saving time and cost (Tayab & Li, 2024). These aren't isolated wins, think blueprints. Take note.

Examples of Tasks Being Automated or Augmented

The most immediate effects of AI in logistics are showing up at the task level, especially in areas once dominated by repetitive, manual processes. Automation is already replacing low-skill tasks across transport roles (Karakikes et al., 2025, p. 2985). These changes are reshaping how work gets done on the ground. The scope of automation has expanded from back-office assistance to frontline execution, touching nearly every step of the fulfillment cycle.

AI now handles dispatch planning by analyzing dozens of variables to assign loads, optimize delivery windows, and reduce deadhead miles. Predictive algorithms dynamically manage inventory levels based on seasonality, order trends, and external demand signals. Freight load optimization systems calculate how to maximize trailer space, balance weights, and minimize unnecessary trips using real-time data inputs, which is reshaping cost structures, workforce allocation, and service expectations.

AI-powered natural language processing (NLP) is also rapidly advancing logistics back-office functions, such as interpreting shipping documents, classifying addresses, and sorting billing data. Unlike rigid RPA systems, NLP requires “virtually no configuration or learning” to get started and can adapt to varied document types with semantic understanding (Tayab & Li, 2024). This flexibility is a breakthrough because document formats vary widely by vendor, customer, or region. NLP models can extract structured data from unstructured text and email confirmations with minimal manual intervention. In doing so, they reduce exception handling, cut down on data entry errors, and accelerate processing time across procurement, finance, and customer service. NLP has a relatively new ability to understand context. While older systems depend on fixed field positions or templates, NLP interprets meaning, making it far better suited for the unpredictable, messy text that defines real-world logistics paperwork. As these models evolve, logistics firms are beginning to apply NLP not only for processing documents, but also for automating internal workflows like responding to carrier emails, flagging policy exceptions, or updating ERP systems based on natural language inputs.

This shift has real business impact. DHL, for instance, redeployed 15 of 30 warehouse staff to higher-value roles after integrating robotics and AI. The result: a 50% increase in workforce capacity and an automation system now performing the equivalent of 300 full-time jobs, with ROI achieved in under a month, according to a 2024 case study. That's not nothing.

Still, broad adoption remains elusive. “Only 1% indicate that they have been able to fully automate processes,” Hong & Allgood (2024) observe, pointing to the scale and complexity of legacy systems as major roadblocks. And while logistics companies race to modernize, Deloitte

(2024) warns that adoption in “frontline workforce productivity, recruitment, and retention is too low to measure impact” (p. 9).

Despite the cautionary tales, logistics work isn’t disappearing. It is changing form right before our very eyes. Tasks like dispatch planning, stock control, and freight optimization are increasingly automated, but that elevates the role of human workers as coordinators, analysts, and problem-solvers. As Karakikes et al. (2025) affirm, “the use of real-time data and digital communication systems has made it possible for transport companies to optimize their operations,” but that optimization is only sustainable if the workforce evolves with the systems (p. 2985). Roles once centered on manual repetition now demand critical thinking, tech fluency, and adaptive decision-making (Nugroho, 2025). HR, you’re up!

Companies that fail to recognize this reality will look archaic and they’ll experience real-world setbacks: underperforming assets, missed deliveries, and rising attrition. The edge will belong to those who invest in AI and reskill their workforce to use it.

The Workforce Skills Gap is a Direct Threat to Supply Chain Performance

As AI, automation, and digital platforms become deeply ingrained in logistics operations, a critical vulnerability has emerged: workforce readiness is failing to keep pace. Even the most advanced systems are only as effective as the people operating them. The success of logistics transformation is only as strong as the human capacity operating it. Without a workforce capable of interpreting, managing, and optimizing these technologies, operational disruptions multiply, fulfillment errors increase, and the returns on billion-dollar investments falter (Ozturk, 2024; Tayab & Li, 2024).

This growing skills gap has become a central constraint for transportation and logistics. Over 60% of logistics employees struggle to meet digital competency requirements, making it difficult to adapt to new forms of automation and data-driven workflows (Nugroho, 2025). Despite the rapid deployment of AI, many companies still rely heavily on semi-skilled labor. For example, only 28% of logistics workers in Malaysia are considered skilled, underscoring the broader global mismatch between workforce capabilities and the demands of Industry 4.0 (Wahab et al., 2021). These figures reveal systemic issues that can stall broader modernization efforts. In more developed markets, the issue often manifests not as a lack of basic skills but as an inability to apply them in dynamic, tech-integrated settings. Workers may know how to use digital systems in isolation but struggle to respond when multiple systems interact in real time across fulfillment, dispatch, and inventory workflows.

While technical skills remain vital, emerging research shows that by 2030, employers will prioritize higher cognitive abilities, such as flexible thinking and complex problem-solving, over narrow technical training (Polydoropoulou et al., 2023). This signals a shift toward more adaptive, cross-functional roles in logistics. “Today’s frontline workers are technology operators and creative problem solvers,” argue Allgood and Perez (2025, p. 5). It isn’t enough, though, to have a one-shot training session on how the system works. Workers have to be equipped to navigate ambiguity, troubleshoot unexpected failures, and coordinate across departments and digital ecosystems. Yet most companies lack a coherent talent strategy to reflect this change. One Deloitte study found that only 10% of leaders feel their workforce is prepared for generative AI adoption, even as one in four anticipate major shifts in job roles within the year (Deloitte, 2024, pp. 19–20). This disconnect between leadership expectations and operational readiness creates a domino effect that slows transformation. Workers feel blindsided by new systems, and managers are forced to choose between delaying rollouts or risking costly errors during implementation.

Several structural issues compound this readiness gap. Over 70% of industry stakeholders report inadequate training and poor communication around upcoming changes (Polydoropoulou et al., 2023). Many companies also lack the professional trainers or internal specialists to develop tailored education programs for their evolving mobility systems (Karakikes et al., 2025,

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p. 2998). This shortage of instructional leadership leaves companies without a clear playbook. Meanwhile, global projections are stark: the World Economic Forum estimates that 50% of workers will require reskilling by 2025 (Hasan et al., 2024), yet only 30% of logistics organizations have taken meaningful steps toward digital workforce transformation (Nugroho, 2025). In many cases, the problem is not willful neglect but organizational inertia. Training budgets are siloed, reskilling programs are disconnected from tech investments, and HR departments often lack the authority to influence broader strategic planning.

This disconnect between technology adoption and workforce preparedness is a business performance risk. Manual processes, underutilized platforms, and misaligned roles are already contributing to system breakdowns. The operational costs are shown in the bottom-line figures. As Neo et al. (2025, p. 10) note, inefficiencies in dwell time alone cost the U.S. trucking industry \$3.6 billion in direct losses and over \$11 billion in lost productivity annually.

Industry Signals That Skills Are Falling Behind Tech Adoption

Across logistics networks, the symptoms of this workforce misalignment are visible and mounting. Persistent labor shortages remain a top concern, with the American Transportation Research Institute (ATRI) ranking driver and warehouse staffing issues among the most pressing industry risks. Despite widespread AI adoption, most organizations have not implemented corresponding reskilling programs. This creates a dangerous mismatch between advanced systems and the employees expected to use them.

As a result, technology often outpaces workforce training, leading to system errors, reliance on workarounds, or platform underuse, outcomes that weaken ROI and introduce new layers of risk. Instead of driving efficiency, AI can unintentionally magnify existing inefficiencies when layered into an unprepared workforce. “There is a pressing need for employees who are not only proficient in their traditional roles but also adept in interacting with and managing AI technologies,” note Adio et al. (2025, p. 612). In many companies, this pressing need remains unmet.

Why Hiring Alone Can’t Keep Pace With Technological Change

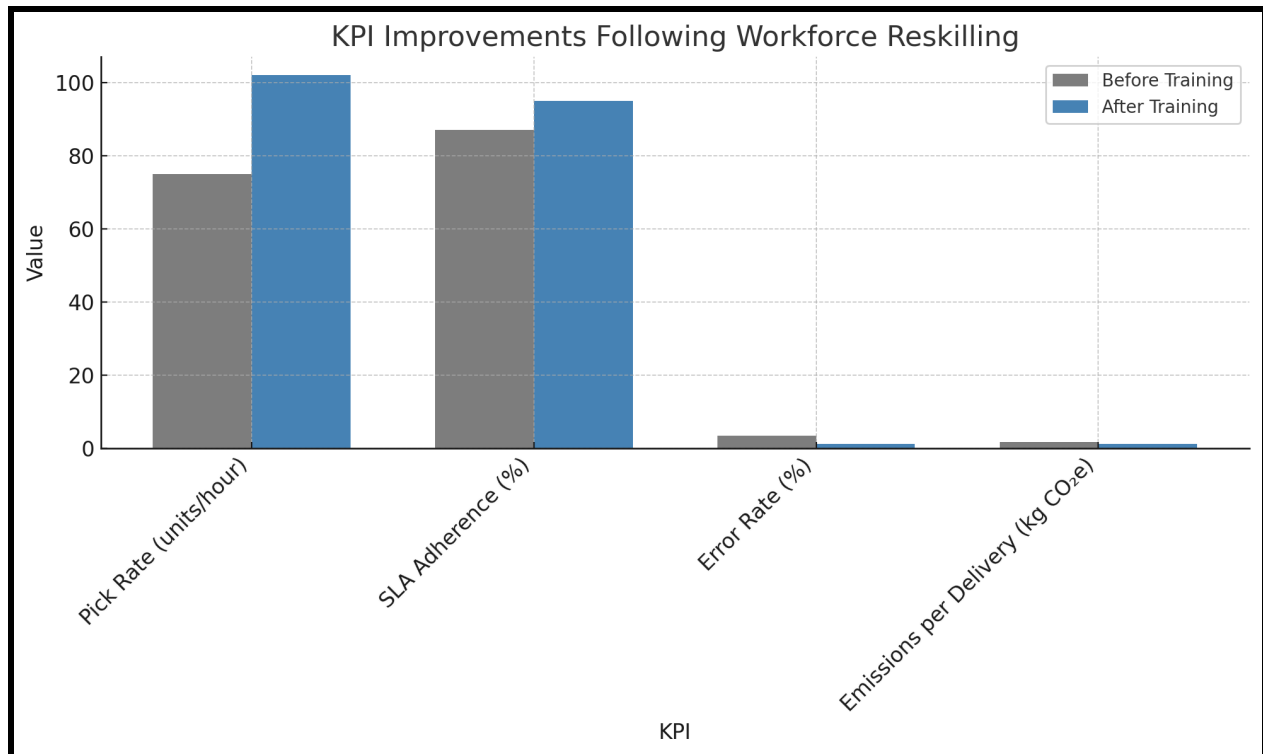
The instinctive response to talent shortages is often external hiring, but in today’s environment, that strategy alone is insufficient. Skilled, AI-literate logistics professionals are in short supply. Companies face increased salary demands, longer hiring timelines, and high turnover among frontline staff. “Despite wage increases outpacing inflation, frontline turnover remains high with 41% of workers planning to leave their jobs within the next 3–6 months” (Allgood & Perez, 2025,

p. 7). The market for digitally capable talent is tightening, and companies compete over the same limited pool of external candidates, many of whom lack the sector-specific knowledge.

Beyond cost, hiring externally introduces delays and operational inconsistencies. Research suggests it takes 6–9 months of salary to replace a single skilled employee—\$30,000–\$45,000 for mid-level roles (Wahab et al., 2021). In contrast, strategic internal reskilling boosts morale, supports retention, and enhances adaptability. “Strategic HR management, including comprehensive training programs,” write Adio et al. (2025, pp. 613–614), “is essential to maintain operational continuity and employee morale as tasks shift due to automation.” The upfront costs of training are often dwarfed by the hidden cost of turnover. When companies rely solely on hiring, they absorb not just salary and onboarding costs, but weeks or months of reduced productivity while new staff climb the learning curve. Timing, precision, and volume coordination are king, so this transition period can be particularly disruptive. In high-volume logistics environments, even small delays in dispatch, routing, or warehouse coordination can have ripple effects across the supply chain. These slowdowns erode customer satisfaction and increase the likelihood of human error during periods of adjustment. And when those errors compound, the consequences directly affect customer trust and brand reliability.

Indeed, companies that invest in reskilling outperform peers relying solely on new hires. Reskilled employees acclimate faster, retain institutional knowledge, and enable companies to pivot in real time without recurring onboarding costs. “To take advantage of the latest technological advancements,” conclude Hong & Allgood (2024), “organizations must maximize the knowledge base of their existing workers.” Investing in internal talent also reinforces a culture of loyalty.

The operational impact of reskilling becomes especially clear when tracking performance metrics before and after structured workforce training programs. Across case studies, key indicators like fulfillment, speed, error rates, and throughput capacity consistently improve when frontline teams are equipped to handle automation confidently and proactively.



Illustrative data based on case studies and industry research from Deloitte (2024), DHL (Tayab & Li, 2024), Wahab et al. (2021), and Hong & Allgood (2024).

Downtime vs. Training: Quantifying the Real Operational Tradeoffs

Some companies hesitate to invest in workforce training due to perceived cost or time constraints, but the cost of *not* training is often far greater. Undertrained employees operating AI dispatch platforms can trigger routing errors and late shipments. Misused warehouse automation systems slow pick rates and increase error rates. These operational breakdowns ripple outward, leading to SLA penalties, reputational damage, and customer churn.

The numbers are clear. A 2025 study of cold chain logistics found that while IoT infrastructure increased upfront costs by 15.45%, it also reduced operating costs by 26.85% and transportation costs by 60%, yielding a net cost reduction of 2.78% (Nozari et al., 2025). These savings were only possible through workforce readiness and digital optimization.

Similar benefits were seen in logistics giants like DHL and FedEx, which used robotic process automation (RPA) to reduce task completion time by 30% and error rates by 20% (Tayab & Li, 2024). These gains demonstrate what is possible when training and technology evolve in

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tandem. “Interventions must be preceded by individual, team, and whole-organization assessments that map key needs... using integrated training, coaching, and mentoring methodologies,” recommend Karakikes et al. (2025, p. 2999).

Without these investments, delays persist and the consequences grow more costly. According to Neo et al. (2025, p. 11), idling trucks during rest periods emit 11 million tonnes of CO₂ annually, equivalent to the emissions of a small European country. These inefficiencies are financial, environmental, and reputational liabilities.

The future of logistics will not be determined solely by the technologies companies adopt, but by how well their workforce can harness them.

Overcoming the Barriers to Workforce Reskilling in Logistics

Despite widespread recognition that AI and automation are transforming logistics, many organizations remain stalled at the point of workforce adaptation. Reskilling efforts are uneven, compartmentalized, or postponed altogether, not because the need is unclear, but because the execution runs into friction at every level. The problem lies in its implementation.

According to Karakikes et al. (2025, p. 2985), governments and employers have a responsibility to “invest in upskilling and retraining programs” to ensure that workers can adapt. Yet in practice, workforce transformation is often blocked by cultural inertia, educational limitations, and organizational misalignment. Even when funding and leadership buy-in exist, day-to-day behaviors and priorities don’t always follow suit. When stakeholders were asked to identify the biggest roadblocks to workforce readiness, their responses clustered around six recurring themes: cultural, educational, demographic, technological, economic, and regulatory (Polydoropoulou et al., 2023). These obstacles play out on warehouse floors, dispatch screens, and team meetings every day. The barriers are hidden in plain sight in the systems, routines, and assumptions that govern operations.

Employees voice concern over job loss, distrust automation, and show hesitation in stepping beyond familiar roles. One respondent noted that workers often experience “dissatisfaction due to tasks being performed automatically” and show “unwillingness to shift beyond known expertise” (Polydoropoulou et al., 2023). These feelings can be seen as resistance to change, but they reflect a deeper disconnect between how automation is introduced and how it’s experienced by workers. This pause is exacerbated by ethical uncertainty and data privacy fears, especially when AI systems feel opaque or unaccountable. Adio et al. (2025, p. 618) emphasize the need for a robust ethical framework to guide deployment, noting that “data privacy, surveillance, and algorithmic bias pose significant challenges.” Without transparency and trust, even a well-designed system can breed anxiety rather than empowerment. As Upton Sinclair famously said, “It is difficult to get a man to understand something when his salary depends upon his not understanding it” (Sinclair, 1934).

Compounding this resistance is a gap in basic preparedness. Many companies still lack a digital culture or the infrastructure to implement comprehensive training (Wahab et al., 2021). In these environments, even small changes can feel overwhelming because there’s no foundation for continuous learning. Deloitte’s 2024 report echoes this concern, revealing that organizational risk management and governance are the most widely reported barriers to AI implementation (p. 15). Even when leadership voices support for reskilling, cultural and logistical follow-through often lags. “The biggest challenge is no longer access to automation,” write Allgood & Perez (2025, p. 10), “it’s the human capacity to adapt.” That gap between endorsement and execution is often where transformation efforts stall.

As these pressures mount, the most successful companies are treating reskilling not as a response to disruption, but as a lever for growth. Stakeholders in Polydoropoulou et al.'s (2023) study overwhelmingly identified reskilling as the top opportunity created by automation, not merely a defensive move. Effective strategies included cross-team training cohorts, “train-the-trainer” models, and programs designed to be both “creative and motivating,” not rote or generic. These programs signal investment in people, which boosts morale, loyalty, and willingness to change.

Still, even well-intentioned efforts can falter without addressing deeper organizational misalignments. The following barriers are the most frequently cited and the most solvable.

Lack of ROI Visibility

One of the most persistent barriers to reskilling is its intangible return. Unlike a warehouse management system (WMS) or dispatch platform, training doesn’t produce an obvious capital asset, as it isn’t nestled neatly on a balance sheet. As a result, it is often viewed as a “soft” investment and deprioritized during budget cycles. Deloitte (2024, p. 10) notes that many firms are still figuring out how to quantify AI’s benefits or link them to clear financial outcomes.

Yet case studies show the payoff is real. DHL’s robotic process automation (RPA) pilot recovered its full investment within one month, demonstrating that, with thoughtful deployment and measurement, reskilling and automation can generate tangible returns (Tayab & Li, 2024). Hasan et al. (2024) advocate for greater scrutiny of how reskilling techniques align with long-term ROI, emphasizing that training efficacy depends on organizational context. When reskilling is customized, tracked, and tied to specific use cases, it can unlock value that exceeds initial expectations.

To overcome this, firms should tie workforce development to measurable operational KPIs such as reduced downtime, increased fulfillment accuracy, or improved employee retention. These metrics speak to efficiency and can help reframe training as more than a cost. As Hong & Allgood (2024) point out, companies must be strategic about where they invest time and capital to optimize value chain performance. Moving reskilling into core performance dashboards will put it on the radar of executive strategy, where it needs to be.

Executive Buy-In Without Operational Follow-Through

Support from leadership is often strong in theory, but weak in practice. Deloitte (2024, p. 4) found that while many executives express enthusiasm for AI adoption, just one in five

companies has implemented it broadly. The misalignment stems from initiatives confined to HR or L&D teams, with little integration into core operational goals.

When operational leaders aren't part of the reskilling effort, adoption slows, and frontline metrics suffer. Without their input, training programs don't reflect the on-the-ground reality, which highlights the point that there is an enormous disconnect between theory and practice. In one case, SLA adherence dropped by 9 points after an automation rollout led by HR lacked dispatch team input.

Nugroho (2025) argues that leadership must go beyond verbal support and create work environments that actively support innovation and collaboration. Yet in many companies, upskilling is concentrated only among high-value roles. Wahab et al. urge leaders to take a broader, strategic view: treating workforce development as essential infrastructure rather than a discretionary expense.

As Hong & Allgood (2024) note, "a gap exists between strategic intent and operational delivery." The gap takes form in delays, confusion, missed KPIs, and higher turnover. The solution is to embed training outcomes into team-level goals, link them to logistics performance metrics, and empower operations managers (not just HR leaders) to drive execution.

Frontline Skepticism and Training Fatigue

For warehouse teams, drivers, and dispatchers, the pace of digital change can feel relentless. New tools arrive while previous ones are still being learned, and past training may have felt irrelevant or overly theoretical. This familiar pattern eats away trust in future initiatives, especially when workers perceive leadership as chasing trends without follow-through. The result is withdrawal, burnout, and growing skepticism.

Hasan et al. (2024) caution that "outdated or inappropriate training" weakens program effectiveness, especially when it fails to reflect day-to-day tasks. Meanwhile, Wahab et al. highlight how older workers often struggle with new digital skills, while younger ones may embrace change but still require clear direction. Without tailored training, both groups fall through the cracks.

Nugroho (2025) emphasizes the importance of change management strategies to mitigate fears around job security. Karakikes et al. (2025, p. 3000) also stress the need to hear and address worker concerns directly, especially when resistance stems not from laziness but practical constraints like time, fatigue, or unclear goals. Ignoring only deepens disengagement.

To rebuild trust, companies must focus training on immediate, role-specific outcomes. Microlearning formats, milestone tracking, and visible wins (like improved picking speeds or route optimization) help reinforce progress. When reskilling feels relevant and rewarding,

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skepticism fades. Also, when employees can directly connect training to job performance, the resistance gives way to buy-in and momentum.

For example, a U.S. distributor saw a 28% drop in warehouse picking speed after launching a new fulfillment app without role-specific onboarding. By contrast, firms using just-in-time “microbursts” of mobile training saw 15–20% faster uptake with lower fatigue (Hasan et al., 2024). The only difference was how it was introduced.

Poor training impacts morale and shows up in key, measurable metrics. Companies report higher error rates, longer ramp-up periods, and lower retention among reskilled roles when training is generic or misaligned. Operations managers must be accountable for making reskilling feel useful and job-relevant.

Misaligned Technology and Training Rollouts

One of the most damaging mistakes logistics companies make is deploying technology before their workforce is ready. New platforms launch without sufficient lead time, resulting in workarounds, errors, and underused systems. Instead of accelerating efficiency, progress is impacted. This misalignment wastes functionality and deepens worker frustration, and what should be an upgrade becomes a headache.

At a Southeast Asian 3PL, a major TMS deployment was delayed 3 months after frontline users rejected the system due to a lack of input during training design (Wahab et al., 2021). The takeaway is that without user engagement and readiness, even the most sophisticated platforms can hit a wall.

Deloitte (2024, p. 6) notes that while many companies scale core operational functions, they often neglect the HR infrastructure required to support workforce readiness. Wahab et al. recommend preemptive skills-gap analyses and the use of Competency Management Software (CMS) to map internal capabilities and guide training design. These processes move beyond the administrative; they provide a blueprint for aligning workforce capabilities with tech rollout.

Wasted tech investments are a direct outcome. A regional logistics provider invested in a TMS platform only to see 40% of users revert to spreadsheets due to poor training integration. The system wasn’t the problem so much as the rollout. CIOs and training leads must coordinate implementation timelines to ensure that workforce enablement precedes system go-live. Otherwise, the investment fails twice, once in dollars and again in adoption.

To fix this, reskilling must be integrated into rollout timelines. Ramp-up periods, training-first approaches, and change management frameworks prioritizing user buy-in and not just compliance are essential. When employees are prepared ahead of deployment, adoption becomes smoother, resistance drops, and ROI becomes measurable.

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No System for Champions, Incentives, or Milestones

Even when reskilling programs are launched, they often lack the infrastructure to scale. Programs lose momentum without internal champions, employee feedback loops, and progress tracking. Initiatives that begin with vigor quietly fizzle without sustained support. Wahab et al. point to the success of Malaysia's Human Resources Development Fund (HRDF) and the GENERATE 2.0 initiative, which supports continuous learning through structured public-private programs.

According to Hong & Allgood (2024), what works is designing organizations with the flexibility to move talent across functions. High-performing companies treat workforce development as a shared responsibility, embedding it into KPIs and leadership culture. Neo et al. (2025, p. 8) emphasize that many of these programs are “no regrets” moves that enhance core business operations while also building resilience.

Mentorship and coaching, digital learning platforms, and micro-incentives all reinforce a learning culture. “Mentorship programs provide personalized guidance,” write Hasan et al. (2024), while “recognition initiatives cultivate a culture of innovation.” Nugroho (2025) also notes that companies can accelerate adoption through partnerships with tech startups and flexible formats like webinars and simulations. These are foundational elements of systems that stand the test of time.

AI-supported solutions can play a role as well. Nozari et al. (2025) report that optimization algorithms like the Emperor Penguin Optimizer (EPO) achieved equivalent results to traditional methods while cutting solution time by 70%, proof that human-machine collaboration can streamline decision-making when skills and systems align.

Resistance to reskilling doesn't stem from apathy, it stems from misalignment. Cultural hesitation, unclear ROI, disconnected leadership, and training fatigue are real, but solvable. Companies that face these challenges directly through integrated rollout plans, feedback systems, and shared accountability position workforce development not as a sunk cost, but as a scalable asset. They transform reskilling from a stalled initiative into a force multiplier for performance, innovation, and retention.

Business Risks and Accountability Map

Barrier	Consequence if Unaddressed	Who Must Own It
Lack of Roi Visibility	Budget deprioritization, underinvestment	Finance, Strategy Leads
Executive Buy-In Without Follow-Through	HR-led programs that stall in execution	COO, Ops Directors
Frontline Skepticism & Fatigue	Higher error rates, lower morale	Site Managers, Team Leads
Misaligned Rollouts	Tech underutilization, slow ROI	CIO, Training/HR
No Champions or Milestones	Program stagnation, no scalability	Department Heads, L&D

Making the Case: A Strategic Comparison of Reskilling vs Hiring

In an era of AI-driven transformation, logistics companies are racing to modernize, but workforce readiness remains a limiting factor. While hiring externally may seem like the fastest way to close skills gaps, the evidence shows a stronger, more sustainable path: strategic reskilling of internal teams.

In AI-augmented supply chains, technology alone does not guarantee efficiency; it's the workforce that determines whether automation investments yield meaningful returns. As Karakikes et al. (2025) note, "upskilling and retraining... can help workers acquire the skills they need to succeed in the new digital and automated transport landscape" (p. 2985). This shift from ad hoc training to structured internal development reflects a deeper realization: human capital is a multiplier. The most effective logistics firms are building internal talent engines that make transformation stick. This insight is now being validated at scale by operational and economic data across logistics organizations.

Companies that invest in their current workforce are seeing real gains. Deloitte (2024) reports that "leaders also are significantly more likely to say they expect to increase headcount because of gen AI," suggesting that the most AI-prepared firms are those expanding talent, not replacing it (p. 20). One in four Gen AI leaders expect to shift their talent strategy within a year to focus more on internal development (Deloitte, 2024, p. 20), signaling that reskilling is fast becoming the dominant strategy in future-ready operations.

Why Reskilling Internal Talent Outperforms External Hiring

Even beyond ROI, there's a deeper reason reskilling works, and that is because it aligns with how logistics teams operate and evolve in the real world. Hiring externally often fails to address the deeper cultural and operational challenges AI introduces. Outside hires may lack contextual knowledge of logistics systems, customer demands, and organizational workflows. Reskilled internal employees, on the other hand, already understand the operational rhythms of the company and can adapt more quickly to AI-powered tools. As Wahab et al. emphasize, reskilling also fosters deeper loyalty by allowing companies to "show concern for the employees' career and their future," turning training from a sunk cost into a strategic asset.

Adio et al. (2025) add that "strategic investments in employee retraining and redeployment programs can mitigate the adverse effects on employment" (p. 618). This reframes reskilling not just as a form of protection for workers, but as a stability mechanism for the business itself, minimizing disruption and preserving institutional knowledge in times of rapid change.

Transformation leaders increasingly view rethinking employee capabilities and investing in tailored upskilling programs as compulsory. As Hong & Allgood (2024) explain, “rethinking employee capabilities and development, and investing in reskilling and upskilling programmes, is viewed as foundational by leaders who have succeeded in value chain transformation.” These efforts reduce risk as well as helping unlock the full value of AI deployments, which increases productivity, adaptability, and employee engagement in tandem.

The alternative, hiring new staff or waiting for the market to adjust, comes with real downsides. New hires face steep learning curves and lack operational context. Doing nothing leads to underutilized technology, frustrated teams, and substandard performance metrics. Reskilling creates measurable and immediate operational advantages.

Field-Tested Case Studies: Measurable Gains from Targeted Reskilling

Case studies from leading logistics firms reinforce this shift. Rather than relying on the external talent market, these companies are building from within and reaping measurable benefits. For example, AI deployment in companies like Maersk has demonstrated the power of building from within. Rather than sourcing external talent, Maersk trained existing staff to use AI systems for tasks like customs clearance and route planning, avoiding delays, reducing onboarding friction, and maintaining consistent output (Ozturk, 2024).

Similarly, Deloitte (2024) finds that Gen AI leaders tend to have “11 or more at-scale implementations” and “report high economic value in at least three use case areas” (p. 18), pointing to the cumulative advantage of a ready, reskilled workforce.

When internal workers are properly equipped, they can integrate new tools faster and more effectively. Their domain knowledge, including logistics workflows, customer needs, and service expectations, is a foundation for faster adoption and fewer operational errors. Even the most advanced automation system will underperform in the hands of a team that doesn’t fully understand or trust the technology.

Companies that offer reskilling pathways often see reduced attrition. When employees are shown a clear future within the company, they’re more likely to stay and contribute meaningfully. It is more than just a retention win. Wahab et al. found that internal development initiatives strengthen commitment and alignment, creating a more stable workforce that is resilient under change.

That stability extends to technology investments themselves. Without a capable workforce, robotics, AI, and optimization platforms may be underused, expensive assets with little payoff. As Karakikes et al. (2025) explain, organizations should “explore and define new occupational

profiles... including skills and competencies required for these new roles” (p. 2998), reinforcing the need to align technological advancement with internal capability building.

Even more compelling are the field-tested results.

A growing body of research and industry transformation reports shows that when reskilling is implemented directly into logistics operations, companies unlock measurable performance gains and not theoretical benefits, but operational improvements tied to speed, accuracy, and efficiency. At a third-party logistics (3PL) provider, warehouse robotics initially delivered only modest throughput gains due to workflow confusion and resistance from frontline workers. After implementing a targeted reskilling program, order picking speeds improved by 22% in six months, and error rates dropped by 15%. A regional trucking firm experienced similar results. Once dispatchers were trained to use a new AI optimization platform, the company reduced empty miles by 17% and improved on-time deliveries by 9%.

At DHL Global Forwarding, the introduction of robotic process automation (RPA) enabled the company to reallocate half the employees in the trial to more strategic work. This freed up capacity equivalent to 300 full-time positions, demonstrating how upskilling can unleash hidden workforce potential (Tayab & Li, 2024).

Ozturk (2024) highlights additional global examples: Alibaba’s reskilled teams are enhancing customer experience through AI-based recommendation engines and multilingual chatbot support, while Maersk and DHL continue to expand AI-based systems for fuel optimization and automated warehousing, all powered by internal development, not external hires.

Internal role redefinition and workforce empowerment in consumer goods helped a leading CPG company achieve 95–98% on-shelf availability through real-time data sharing (Hong & Allgood, 2024). These gains were the product of internal teams trained to lead in tech-augmented environments.

Reskilling as a Competitive Advantage in AI-Augmented Supply Chains

Industry consensus is clear: reskilling must be continuous, customizable, and an inseparable part of daily operations. Organizations that embrace this rhythm are the ones seeing long-term gains. That flexibility ensures inclusive, ongoing development rather than one-time interventions, and it’s a crucial differentiator in supply chains where adaptability is everything.

In a competitive environment, reskilling accelerates tech adoption, reduces costly turnover, and ensures companies meet rising service expectations. Companies that invest in reskilling are future-proofing themselves.

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Blueprints for Upskilling in AI-Driven Logistics Operations

Transforming a logistics workforce to thrive alongside AI and automation demands more than standard training. It requires precise, role-specific blueprints that incorporate skill development directly into day-to-day operations. One-off seminars or passive LMS modules won't cut it. To protect and adapt their workforce, companies must build learning ecosystems that are continuous, measurable, and fully operationalized. Think of this as a learning optimization challenge.

Successful upskilling strategies start with clarity: companies must define what roles are changing, what competencies are needed, and how employees can advance into newly digitized positions. Karakikes et al. (2025) emphasize that “policymakers can work with industry experts, employers, and workers to assess the current state of competencies in the sector, and to identify... required skills” (p. 2997). That same principle applies at the company level, where internal skills audits and strategic role-mapping are the first steps to targeted reskilling.

Industry front-runners are designing skill-building directly into operational workflows. By integrating training into port operations, fleet tracking, and customer service touchpoints, upskilling becomes inseparable from performance. Companies like Maersk and DHL, for example, have already begun embedding AI capabilities across core logistics functions from port operations and fleet tracking to customer service and customs clearance. This integrated approach prevents siloed learning and ensures that upskilling aligns with cross-functional transformation (Ozturk, 2024). To sustain this, education must be accessible, role-specific, and scalable.

Deloitte (2024) echoes this point, noting that although their report does not offer a singular blueprint, many transformation leaders are investing in practitioner training, governance frameworks, and internal audits, all of which can be woven into structured reskilling programs (p. 21). In short, the best strategies aren't one-size-fits-all. They are custom-built to match operational complexity.

Tactics for Building Future-Ready Logistics Talent

Companies are shifting from traditional credential-based to skills-based advancement. This approach evaluates employees by proven competency in tech-adjacent skills. Internal mobility pathways give employees a clear future inside the organization. The transition from warehouse worker to AI systems lead isn't as big of a step as it seems for companies willing to define the path and not just adopt the technology. As Deloitte (2024) notes, “most [leaders] recognize the

need for a new talent strategy due to gen AI” (p. 20), and skills-based progression is a key piece of that shift.

Microcredentialing can also help. Logistics firms increasingly use stackable certifications for high-impact areas such as warehouse robotics troubleshooting, fleet analytics, and dispatch AI platform mastery. These bite-sized credentials allow workers to build real expertise without pausing their careers. Hasan et al. (2024) highlight how modern educational platforms can personalize and tailor training content to each employee’s role and pace, offering real-world flexibility that today’s operations demand.

These programs become even more powerful when combined with external partnerships. By collaborating with vocational schools, technical colleges, and EdTech providers, companies can co-develop logistics-specific curricula that reflect real workflows. Karakikes et al. (2025) recommend policymakers and companies alike “engage with educational institutions... to ensure that reskilling programs are aligned with the needs of the sector” (p. 2999). In practice, this may include subsidized coursework, hybrid apprenticeships, or on-site credential testing, all tied directly to business needs.

Creating Internal Ecosystems That Scale

Upskilling cannot rely solely on classroom models. Instead, successful programs build learning ecosystems and organizational structures that enable workers to access training when and where needed. Internal learning management systems (LMS) are a natural hub for logistics-specific courses and AI tool tutorials. But these systems must go beyond static libraries.

Frontline teams benefit most from mobile-first, microlearning modules, especially in warehouses or fleet roles. Whether through mobile apps or embedded digital kiosks, companies can deliver short, flexible learning experiences directly at the point of need, helping workers reinforce skills during shifts rather than in a classroom. Nugroho (2025) supports this approach, noting that successful companies “build a more flexible and data-driven work culture, where decisions are made based on objective analysis, and employees are given space to adapt to technological changes.”

Some organizations are experimenting with gamified certifications to keep momentum, using points, badges, and leaderboards to recognize and reward training milestones. Others are empower managers to act as learning facilitators, embedding upskilling goals into performance reviews, team huddles, and workflow check-ins. Hasan et al. (2024) describe how simulation tools and experiential learning help reinforce these habits, while Hong & Allgood (2024) emphasize “curiosity and lifelong learning” as essential traits in high-performing, tech-adaptive teams.

Even industry giants are leading by example. According to Hasan et al. (2024), companies like IBM and Amazon “place a high value on continuous learning and growth... offering training programs on emerging technologies and interpersonal skills.” These efforts go beyond productivity to shaping culture. As Allgood & Perez (2025) point out, success hinges on “investment in six core capabilities: work design and safety, talent planning, attraction and onboarding, talent development, talent effectiveness, and culture and experience” (p. 11).

And the most innovative firms are taking it local. Allgood & Perez (2025) share that leading companies now view frontline investment “as a way to shape their own destiny,” leveraging local partnerships, university training, and even niche programming, like e-commerce logistics or customer service communication, to build engagement and long-term retention (pp. 15–16).

Ozturk (2024) adds that Alibaba Cloud’s AI systems support reskilling directly, offering interactive learning environments that use image recognition and natural language processing, allowing logistics workers to train using the same platforms they’ll deploy in the field.

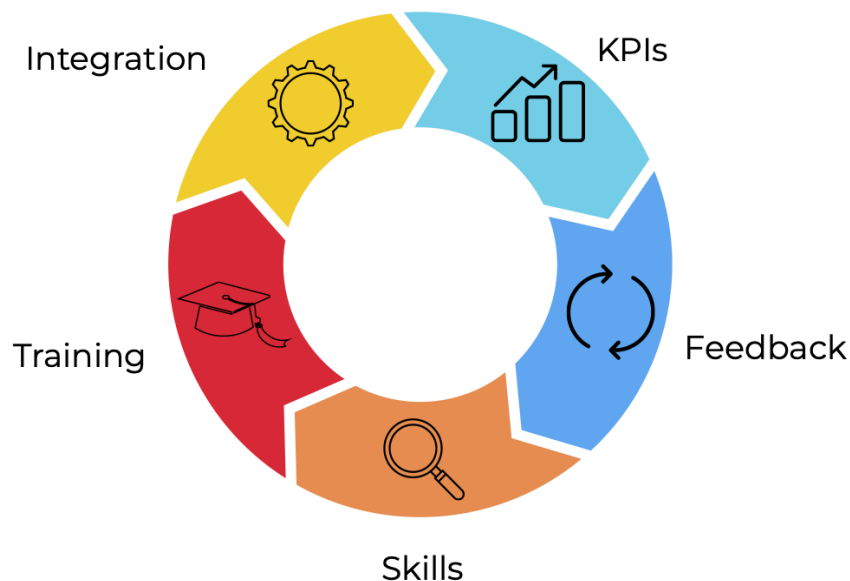
Ultimately, as Karakikes et al. (2025) emphasize, “policy makers can... create opportunities for workers to continually upskill and reskill, including on-the-job training [and] online courses” (p. 2999). That philosophy must guide logistics firms as well: real upskilling strategies are not occasional efforts, they are living systems.

Companies that build internal ecosystems for continuous learning lead. Reskilling becomes a competitive advantage, ensuring operations remain fast, adaptable, and resilient amid constant change. In AI-driven logistics, agility starts with people. And people thrive when training is embedded, accessible, and built to scale.

Operationalizing Workforce Reskilling: How to Make It Real and Measurable

Intention is negligible in workforce reskilling compared to execution. For transformation to stick, upskilling must move from idea to impact. That shift demands a clear methodology, structured feedback loops, and leadership that treats reskilling as essential infrastructure. This section outlines how future-ready firms make workforce transformation tangible and measurable.

Workforce Reskilling Execution Framework



Framework synthesized from operational recommendations in Deloitte (2024), Hasan et al. (2024), Nugroho (2025), and Karakikes et al. (2025).

Embedded Learning Into Culture, Leadership, and Daily Workflows

The logistics sector can no longer afford to treat workforce learning as a side activity. To deliver ROI, reskilling must be entrenched into the cultural and operational fabric of the organization. That begins with leadership. While many executives differentiate themselves on strategy, tech, and systems, Deloitte (2024) found that few have integrated talent development into their

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leadership DNA (p. 19). Learning must be modeled from the top, not just funded, but also normalized.

That includes redefining the skills that matter. Wahab et al. emphasize that IR 4.0 readiness requires a dual technical and human skills investment. While AI, IoT, and data science are substantive, they argue that adaptability, critical thinking, and emotional intelligence must be intentionally cultivated across all levels. These competencies cannot be automated, yet they're often overlooked in planning.

Nugroho (2025) affirms that companies are elevating a culture of self-directed, continuous learning that goes beyond mandatory courses to embrace digital platforms, role-relevant microcredentials, and peer-to-peer learning networks. Hasan et al. (2024) add that aligning skill-building with career growth strengthens employee engagement and long-term retention.

Karakikes et al. (2025, p. 2999) reinforce the importance of supporting emotional change in parallel with digital change, recommending "attendance-specific emotional intelligence programs" to help teams manage transformation fatigue. These findings reflect a broader truth: successful workforce development is about psychological safety, internal motivation, and role clarity.

When companies make learning valuable and personalized, it becomes a source of momentum rather than friction. Baking learning into performance reviews, team meetings, and daily workflows reframes reskilling from a disruptive add-on into a familiar part of the job.

Tracking ROI Through Training KPIs and Operational Metrics

Companies must do more than track participation to scale reskilling. Structured workforce development efforts should include defined benchmarks, measurable outcomes, and tight feedback loops between training content and operational KPIs.

Karakikes et al. (2025, p. 3000) emphasize the power of monitoring and evaluation systems to track effectiveness, address internal imbalances, and highlight who is, and isn't, benefiting from automation. Yet, as Deloitte (2024) notes, only 13% of companies report success in tying Gen AI to revenue or cost reduction (p. 10), a statistic that reflects an urgent need for stronger measurement frameworks.

Wahab et al. recommend logistics-specific KPIs like fulfillment accuracy, cycle times, error rates, and employee retention to track the impact of upskilling initiatives. These are not theoretical metrics. These metrics are tied directly to margin, efficiency, and throughput. Hasan et al. (2024) further note that regular training measurably improves problem-solving and decision-making across frontline roles.

AI itself can reinforce this visibility. In one case, DHL increased parcel sorting capacity by 40% following AI-led warehouse upgrades — a gain directly attributed to trained staff who adapted quickly to automation tools (Ozturk, 2024). Similarly, Tayab & Li (2024) document performance boosts across multiple metrics: a 30% increase in efficiency, a 25% cost reduction, a 20% drop in error rates, and a 15% rise in customer satisfaction, after introducing RPA alongside structured employee training. These numbers reinforce a central insight: automation technology delivers its full value only when paired with workforce readiness.

The infrastructure for measurement must be intentional. Adio et al. (2025, p. 620) stress that success requires AI literacy and a company-wide culture of learning and adaptability. Building that culture does not happen automatically. It requires systems that make outcomes visible, feedback loops that inform leadership, and training formats that evolve as operations scale. Hong & Allgood (2024) caution that implementation curves are slow. Firms must pace and prioritize based on sector demands, not internal convenience.

Nozari et al. (2025) offer a model for using operational data to define success thresholds. Their simulation study used shelf life, routing efficiency, and freshness standards to align technology deployment with business performance. This method can be adapted to workforce development as well. Establishing clear performance thresholds for upskilling helps organizations track ROI with the clarity they apply to logistics or inventory management. Allgood & Perez (2025) emphasize that talent investments can generate up to \$34,000 in EBITDA per frontline worker per year, with ROI multiples of 3–5x. Yet, as they note, few firms apply the same rigor to talent investment as to capital expenditure, a misalignment that leaves value on the table (pp. 10, 14).

Reskilling Methodologies Aligned with Business Operations

Reskilling is most effective when it reflects the structure and pressures of the business. That means shifting away from one-size-fits-all training toward modular, role-specific learning that matches real workflows. Deloitte (2024, pp. 10, 22) emphasizes that implementation success hinges on structured, repeatable processes.

Karakikes et al. (2025, p. 2999) advocate for skills audits and long-term learning pathways tied directly to strategic workforce planning. This ensures that companies aren't just building skills for today's tasks, but for tomorrow's roles. That model aligns with the findings of Nugroho (2025), who links structured HR development to both near-term productivity and long-term business sustainability.

Hasan et al. (2024, p. 620) offer a clear framework for workforce transition based on “targeted training, performance tracking, and employee feedback loops.” This feedback-driven approach allows continuous course correction and deeper buy-in from frontline teams.

Nozari et al. (2025) further illustrate how workforce planning can mirror logistics infrastructure decisions. Their model simultaneously evaluates strategic and tactical factors from distribution center siting to IoT deployment and vehicle routing. Reskilling strategies can borrow this logic: workforce planning should run parallel to tech planning, not lag behind it.

Operationalizing reskilling is about building a system. That system should be designed with the same rigor and measurability that companies apply to capital investments or fleet expansion. When embedded into leadership, tracked through performance metrics, and aligned with business operations, workforce development becomes a strategic lever that unlocks the full potential of digital transformation.

Reskilling ROI: A Comparative Snapshot of Risk vs. Investment

Logistics leaders today face competing pressures: tightening budgets, intensifying labor shortages, aggressive automation timelines, and rising performance expectations. When confronted with a workforce skills gap, the choices may seem limited, but the path a company takes in response has lasting operational consequences. This section reframes the reskilling conversation by comparing the companies' three most common approaches: doing nothing, outsourcing or hiring externally, and investing in internal reskilling. Though each may appear viable at first glance, a closer look reveals stark differences in cost and outcome. What follows is a comparative breakdown of spend and return.

1. The Passive Path: Do Nothing

Choosing to “wait it out” may seem like the least expensive option, on paper. Waiting it out has no upfront training investment, no budget reallocation, and no disruption to the daily flow of work. The path of inaction is very attractive to risk-averse leaders. But beneath the surface, the hidden costs accumulate quickly.

If there is no deliberate upskilling strategy, technology rollouts stumble. Error rates increase, teams resist adoption, and systems underdeliver. The workforce gradually becomes misaligned with operational demands, leading to turnover, missed KPIs, and customer dissatisfaction. As Polydoropoulou et al. (2023) caution, the impact of digital disruption is not evenly distributed, it disproportionately affects field staff, aging employees, part-timers, and those with limited access to retraining. “Workforce disruption... is bound to affect groups constrained by regulatory age limits or vulnerable due to part-time employment and lack of retraining access,” they write, underscoring the systemic risks of doing nothing. You don’t want to lock in structural fragility. As competitors upskill and adapt, companies that do nothing face growing opportunity costs. Tech investments underperform, experienced workers leave, and the organization’s ability to absorb future change steadily erodes.

What begins as a cost-saving measure often ends as a performance liability. Inaction compounds misalignment, turning today’s budget relief into tomorrow’s operational crisis.

Hong & Allgood (2024) also warn that “continuous adaptation to disruption through gradual iteration places value chains at considerable risk.” Inaction may feel safe, but it quietly erodes resilience and creates a more expensive tomorrow in fast-moving, AI-driven environments.

2. The External Path: Outsource or Hire

Many companies try to fill skill gaps by bringing in outside talent or outsourcing technical functions. On the surface, this strategy promises speed, new hires arrive ready-trained (in theory), and outsourcing shifts operational burdens to external partners. But in practice, the cost and risk often outweigh the reward.

Recruiting and onboarding for specialized logistics roles comes at a premium. New employees face steep learning curves, struggle to align with internal systems, and often lack the contextual knowledge that seasoned teams carry. Attrition risk also rises, particularly when companies compete for a limited pool of AI-savvy talent in a competitive labor market.

Outsourcing can cede control over critical data flows, limit visibility across functions, and introduce service variability. Deloitte (2024) notes that while some companies report gains in softer goals like “uncovering new ideas” (58%) or “enhancing client relationships” (56%), few demonstrate consistent returns on core operational outcomes (p. 10). When speed becomes the sole driver of a talent strategy, long-term coherence suffers. Outsourced teams lack familiarity with company culture, priorities, or operational nuance. Fragmented workflows, communication breakdowns, and inconsistent performance quickly surface when the people executing daily tasks aren't integrated into the organization's core processes.

Hasan et al. (2024) argue that companies investing in ongoing education see stronger outcomes: “improved staff flexibility, efficiency, and innovation.” Each dollar spent externally could instead be building institutional capability. That investment isn't just about technical skills. It's about developing people who understand the full context of the business: how systems interact, where risk lives, and how to navigate real-time challenges. Homegrown talent tends to adapt faster to internal tools, builds stronger cross-functional relationships, and exhibits greater loyalty and retention.

Rather than plugging skill gaps with expensive outside solutions, forward-looking firms see training as a productivity catalyst. The value is in what gets retained, shared, and scaled across teams.

And as Karakikes et al. (2025) points out, public-private models and shared investment strategies can help offset the cost of internal development. Exploring “government subsidies, employer contributions, and public-private partnerships” gives companies additional levers to fund training initiatives that stick (p. 2999). Simply put, you can't outsource core competency. And when operational resilience depends on human-machine integration, losing visibility or control can ripple through the entire supply chain.

3. The Strategic Path: Reskill Internally

Internal reskilling requires investment, but so do all alternatives. What sets internal workforce development apart is its compounding return. Every trained employee becomes an amplifier: increasing fulfillment accuracy, accelerating system adoption, and strengthening cross-functional collaboration.

Karakikes et al. (2025) emphasize that companies should “create opportunities for workers to continually develop their skills and competencies... [so] they will be better equipped for mobility within their existing sectors or beyond” (p. 2999). Rather than wait for talent to arrive, future-ready firms grow it from within. Reskilling creates an internal “farm team,” a talent bench that grows alongside the technology, ensuring continuity, cultural fit, and faster time-to-impact.

Ozturk (2024) documents how firms like Alibaba and Maersk have reskilled existing teams to gain measurable improvements in cross-border compliance, predictive accuracy, and operational efficiency. Their results make clear that reskilling is a path to unlocking performance.

Similarly, Tayab & Li (2024) describe how Walmart and DHL achieved rapid automation maturity by integrating RPA into existing ERP systems and training staff to work alongside bots, reducing disruption while accelerating transformation.

Deloitte (2024) finds that companies that commit to structured internal development outperform peers, even if traditional ROI metrics like cost reduction take longer to materialize. Internal capability-building becomes the infrastructure for scalable tech adoption (p. 10). That infrastructure accelerates the technology. Skilled internal teams reduce time-to-value, troubleshoot in real time, and adapt tools to meet evolving needs without relying on third-party intervention.

Polydoropoulou et al. (2023) warn that failing to act can institutionalize exclusion and inefficiency, particularly among workers already disadvantaged by structural barriers. In contrast, internal development ensures opportunity and readiness across the full spectrum of the workforce.

Why This Comparison Matters

Each path, inaction, outsourcing, or internal reskilling, requires investment. But only one offers durable returns across all performance dimensions: operations, talent, and technology.

Strategic Response Comparison: Inaction vs Outsourcing vs Reskilling

	Upfront Cost	Speed to Impact	Operational Risk	Long-Term ROI	Alignment with Company Culture
Do Nothing	Low	None	High	Negative	Misaligned
Outsource / Hire	High	Medium	Medium-High	Variable	Weak
Internal Reskilling	Medium	Medium-High	Low	High	Strong

Comparison based on qualitative insights synthesized from Deloitte (2024), Hasan et al. (2024), Karakikes et al. (2025), and Wahab et al. (2021).

Outsourcing introduces variability and risk. Doing nothing guarantees an eventual breakdown. Reskilling, by contrast, builds long-term alignment between systems and people. As Hasan et al. (2024) put it, “organizations that invest resources in continuous education” become more innovative, agile, and future-ready. Deloitte (2024) reinforces that the true value of reskilling is often revealed through qualitative performance gains, new insights, deeper team cohesion, and stronger client relationships (p. 10).

Internal reskilling supports broader ROI goals in productivity, ethics, and social equity. The authors of several studies frame internal development as a lower-risk, longer-term strategy that balances economic outcomes with social responsibility and long-term resilience (Wahab et al.; Karakikes et al., 2025). In logistics, where margins are thin and downtime is costly, strategic talent development mitigates operational risk while unlocking long-term performance gains.

Reskilling is not the cheapest path but delivers the best long-term value.

The Road Ahead: Building Resilient, Future-Ready Supply Chains

Tomorrow's logistics leaders will not be the companies that automate the fastest but adapt the smartest. The competitive edge will belong to those who recognize workforce development not as a support function, but as a core driver of operational resilience, customer loyalty, and sustainable growth.

What separates long-term winners from short-term adopters is simple: the ability to align technology with talent.

Transportation and logistics firms stand at a pivotal moment. The convergence of AI, predictive analytics, robotics, and real-time optimization redefines the end-to-end value chain. But these technologies do not operate in a vacuum. Without a workforce capable of deploying, managing, and evolving alongside them, even the most advanced tools will fail to deliver. As Deloitte (2024) highlights, only “13% say they’ve succeeded” in capturing the cost savings and efficiency promised by Gen AI, a statistic that reflects not a lack of investment in technology, but a failure to align that investment with people (p. 10). It's not a tech problem. It's a workforce readiness problem.

The risks of delay are escalating. Labor instability, rising turnover, and mismatches between job design and tech capacity are already creating drag across the industry. As Polydoropoulou et al. (2023) observe, companies must do more than roll out training. They must redesign jobs to reflect employee input, communicate the purpose of transformation clearly, and integrate workforce well-being into the change process. “Companies should offer training programs to help employees adapt... promote diversity and inclusion... and redesign jobs to make them more fulfilling,” they write, not as a social ideal, but as a performance imperative.

Karakikes et al. (2025) echo this, urging firms to promote research and educational cooperation to overcome the barriers holding workers back from full participation in the digital economy (p. 2999). These are not simply fringe concerns.

The Cost of Inaction is Measurable and Rising

Companies that ignore the workforce side of transformation face a cascading series of risks. As AI systems scale, those without the skills to operate them are more likely to exit, increasing churn, recruiting costs, and onboarding time. High-tech systems without skilled human operators fall short of their potential because a smart warehouse is only as smart as the team that runs it.

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In other words, your infrastructure is only as prepared as your people.

Delaying workforce development also exposes companies to faster-moving competitors. Deloitte (2024) found that Gen AI leaders, defined as firms with 11 or more implementations and strong economic returns in at least three core areas, are already pulling ahead by aligning their data, talent, and outcome measurement strategies (p. 18). Ozturk (2024) documents how early adopters like Alibaba and DHL have scaled AI-powered infrastructure to improve fulfillment, customer satisfaction, and cross-border trade efficiency. These companies are executing.

In a performance-driven supply chain environment, delays are disqualifiers.

Early Movers Win in the Metrics that Matter

Companies that align workforce reskilling with AI adoption can offer higher delivery accuracy, fewer disruptions, and greater speed, outcomes that directly drive customer loyalty and repeat contracts. In the age of digital procurement, hard performance data is beginning to outweigh long-standing vendor relationships. Companies with quantifiable tech-readiness and verifiable workforce agility will win the next generation of smart contracts.

The advantage compounds quickly. AI-ready companies scale faster. They adopt predictive models, automate scheduling, and optimize fulfillment flows with less friction. And they do so not just with tools, but with teams who know how to use them.

Hasan et al. (2024) point to companies like IBM and Siemens as examples of this strategy in action. Their internal reskilling programs didn't just improve retention or morale, but created workforces that are "more adaptable and versatile," directly strengthening the organizations' ability to compete and innovate.

Workforce Investment as an ESG Strategy

Beyond operational ROI, internal reskilling is emerging as a pillar of corporate responsibility. In a world where environmental, social, and governance (ESG) indicators shape investor confidence and public perception, talent development about performance and positioning. Reskilling builds credibility.

While Deloitte (2024) does not frame its findings through ESG language, it underscores that neglecting workforce development places companies at strategic and reputational risk (pp. 9, 20). Talent strategy is becoming inseparable from brand credibility. And Wahab et al. affirm that equipping workers with robust skills not only supports growth but reduces reliance on reactive

layoffs, aligning directly with the “S” in ESG. This signals a longer-term commitment to workforce stability.

Hasan et al. (2024) make the case even more directly: “Firms must prioritize cultivating workforce agility and adaptability... These traits are crucial for sustaining competitiveness.” In volatile environments this is about market survival.

Hong & Allgood (2024) further affirm the ESG connection, noting that redefined roles and internal collaboration improve customer value and contribute to “a decarbonized and ecologically friendly value chain that is fit for the future.” This reframes reskilling as a market-facing signal of accountability, ethics, and adaptability. Reskilling becomes a social signal.

A Final Word: The Future Won’t Wait

The workforce is changing. That case has been made. Companies that invest in their people today are securing performance and laying the groundwork for longevity in a volatile world. This is no longer a question of optional enhancement.

Workforce development is simultaneously a supply chain strategy and an ESG strategy, as well as risk management, performance assurance, and brand-building, all rolled into one.

The road ahead is clear. Reskilling is the vehicle.

References

- Adio, S. A., Sikhakhane-Nwokediegwu, Z., Erinjogunola, F. L., Ajiotutu, R. O., & Olayiwola, R. K. (2025). *Integrating AI in public transport workforces: A review of HR challenges and opportunities*. International Journal of Multidisciplinary Research and Growth Evaluation, 6(2), 611–624. <https://doi.org/10.54660/IJMRGE.2025.6.2.611-624>
- Allgood, K., & Perez, F. (2025). *Putting Talent at the Centre: An Evolving Imperative for Manufacturing*. World Economic Forum. Retrieved from <https://www.weforum.org>
- Carlan, V., & Vanelislander, T. (2021). Economic aspects of introducing artificial intelligence solutions in logistics and port sectors: The data entry case. *Frontiers in Future Transportation*, 2, Article 710330. <https://doi.org/10.3389/ffutr.2021.710330>
- Deloitte. (2024). *Gen AI transforming transportation: Lessons from the frontier of an emerging technology*. Deloitte Development LLC. <https://www2.deloitte.com/us/en/pages/consulting/articles/gen-ai-transforming-transportation.html>
- Hasan, M., Haque, M. A., Nishat, S. S., & Hossain, M. M. (2024). *Upskilling and Reskilling in a Rapidly Changing Job Market: Strategies for Organizations to Maintain Workforce Agility and Adaptability*. European Journal of Business and Management Research, 9(6), 117–124. <https://doi.org/10.24018/ejbmr.2024.9.6.2502>
- Hong, P., & Allgood, K. (2024). *From Disruption to Opportunity: Strategies for Rewiring Global Value Chains*. World Economic Forum. Retrieved from <https://www.weforum.org>
- Karakikes, I., Thanopoulou, H., Polydoropoulou, A., & Pronello, C. (2025). *Automation and digitalisation on the transport workforce: How can the shock be prevented?* Transportation Research Procedia, 82, 2984–3006. <https://doi.org/10.1016/j.trpro.2024.12.226>
- Neo, C., Riedel, R., & Kochman, T. (2025). *Intelligent transport, greener future: AI as a catalyst to decarbonize global logistics*. World Economic Forum. Retrieved from <https://www.weforum.org>
- Nozari, H., Jafari-Marandi, R., Niknamfar, A., & Sadeghzadeh, S. (2025). *A multi-objective model for green supply chain network design using IoT: Integrating quality preservation and vehicle routing*. Journal of Cleaner Production, 413, 137627. <https://doi.org/10.1016/j.jclepro.2023.137627>

Nugroho, D. A. (2025). *Strategy of Human Resource Development in the Shipping and Logistics Sector to Face Industrial Era 4.0. Enrichment: Journal of Multidisciplinary Research and Development*, 2(12). <https://doi.org/10.55324/enrichment.v2i12.325>

Ozturk, O. (2024). *The Impact of AI on International Trade: Opportunities and Challenges. Economies*, 12(298). <https://doi.org/10.3390/economies12110298>

Polydoropoulou, A., Thanopoulou, H., Karakikes, I., Pronello, C., & Tyrinopoulos, Y. (2023). *Adapting to the future: Examining the impact of transport automation and digitalization on the labor force through the perspectives of stakeholders in all transport sectors. Frontiers in Future Transportation*, 4, Article 1173657. <https://doi.org/10.3389/ffutr.2023.1173657>

Sinclair, U. (1934). *I, candidate for governor: And how I got licked*. Pasadena, CA: Self-published.

Tayab, A., & Li, Y. (2024). *The contribution of the RPA technology in enhancing better business performance in warehouse management. IEEE Access*, 12, 142419–142424. <https://doi.org/10.1109/ACCESS.2024.3470221>

Wahab, S. N., Rajendran, S. D., & Yeap, S. P. (2021). *Upskilling and reskilling requirement in logistics and supply chain industry for the fourth industrial revolution. LogForum*, 17(3), 399–410. <https://doi.org/10.17270/J.LOG.2021.606>

Let's Keep the Conversation Going

The labor powering AI systems shouldn't remain invisible. If this paper sparked ideas, questions, or next steps for your organization, I'd love to hear from you.

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