SemiCab

THE NETWORK ADVANTAGE

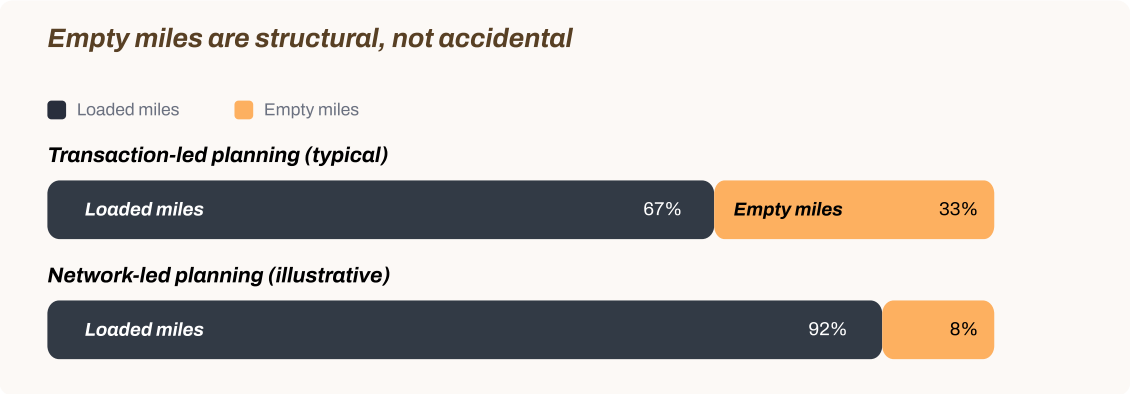
From Transactions to Networks:
A New Operating Model for Freight

EXECUTIVE PERSPECTIVE

Truckload freight has struggled with the same structural problems for decades: fragmented capacity, volatile pricing, unreliable availability, and chronically low asset utilization.

Across markets such as India and the United States, research consistently shows that 30 to 35 percent of truck kilometers run empty. This is not a marginal inefficiency. It is the single largest source of waste in the system (PMC, 2023).

Empty miles are not an operational anomaly. They are the economic signature of fragmentation. When demand and supply are planned as siloed transactions, assets cannot be positioned efficiently across time or geography. The result is a system where costs rise for shippers, earnings remain unstable for carriers, public infrastructure is burdened, and systemic efficiency fails to emerge.



Over time, the industry has attempted to solve this through better rate negotiation, stronger contracts, improved visibility tools, and localized collaboration. These efforts have improved execution incrementally, but they have not changed the system outcome.
The reason is structural.

Freight is a network problem being treated as a transaction problem.

This white paper presents a different operating model for truckload freight. One that explains why efficiency cannot emerge without scale, why scale alone is insufficient, and why system-level intelligence is required to convert coordination into sustained, exponential performance improvement.

The paper is structured in three parts:

1. **The Scale Problem**
2. **The Orchestrated Collaboration™ Dividend**
3. **The System Advantage**

Each part stands independently. Together, they explain how freight efficiency can actually emerge.

PART 1: THE SCALE PROBLEM

Why truckload freight cannot become efficient without network density

Truckload freight does not operate as a single network. It operates as thousands of disconnected transactions running beside each other. This fragmentation is structural.

Where fragmentation comes from

SUPPLY	In most geographies including India and the US, more than 90 percent of carriers are micro or small fleets, each operating only a handful of vehicles. Even the largest operators control limited pockets of capacity in specific regions (PMC, 2023).
DEMAND	Large enterprises plan transportation independently across business units, geographies, and product lines. Visibility rarely extends beyond individual contracts.
SERVICE PROVIDERS	Brokers, LSPs and 3PLs optimize their own contracts. Their success depends on local efficiency, not system-level outcomes.

Why local optimization fails

Local optimization assumes that improving individual lanes or contracts will eventually produce system-wide efficiency. In practice, this creates persistent mismatches between where trucks finish and where demand next appears.

Fragmented planning leads to non-utilized and stranded assets.
Stranded assets lead to empty miles.
Empty miles inflate costs, distort pricing, and destabilize supply.

The persistence of 30 to 35 percent empty miles across freight markets is not an execution failure. It is the predictable outcome of a system that lacks sufficient density to absorb variability across time and geography (PMC, 2023).

Scale as a requirement

This leads to a critical insight:
Efficiency cannot emerge without network density.

Density allows variability in demand and supply to smooth out. It enables assets to be repositioned intelligently and creates the conditions for predictability.

This is why every serious attempt at improving utilization eventually encounters a ceiling.
Without scale, there is nothing to coordinate.
However, scale itself is not an achievement.

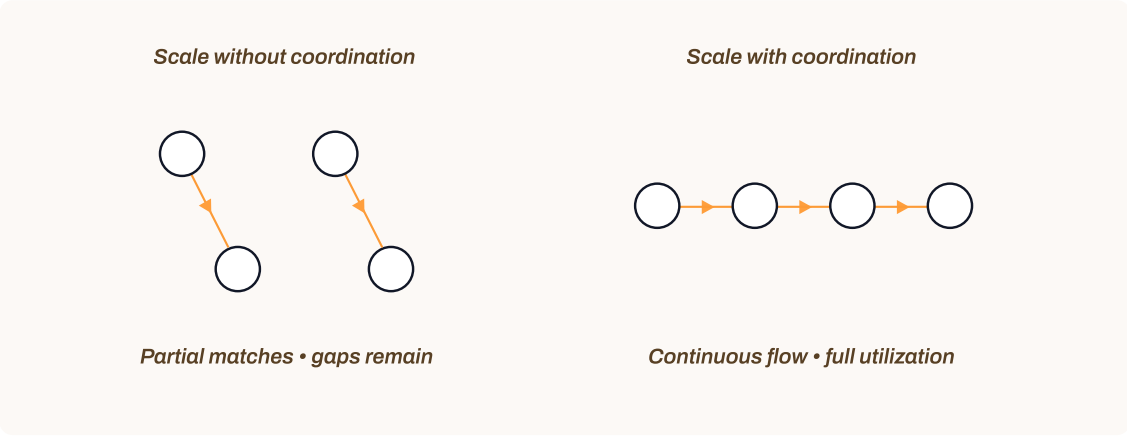
Scale is a requirement.

Why scale alone is insufficient

The industry has repeatedly attempted to create scale by stitching together small groups of customers, often five or six at a time. These efforts usually focus on converting partial truckload utilization into full truckload movement.

This approach compresses leftover demand, but it does not solve non-utilization. It does not create density across time or geography. As a result, these models plateau and fail to expand.

More recently, digital freight brokers have followed a similar assumption, that scale by itself will eventually lead to efficiency. In practice, this efficiency has not materialized.



This leads to a first-order conclusion:

Scale creates the possibility of efficiency.
Efficiency only emerges when scale is activated through coordination.

To convert density into performance, the network requires a second capability.

PART 2: THE ORCHESTRATED COLLABORATION™ DIVIDEND

Why coordination, not contracts, unlocks network value

Once scale exists, the primary constraint shifts from assets to information.
In most freight ecosystems, information is fragmented by design:

- **Shippers see only their own demand**
- **Carriers see only their own fleets**
- **Brokers see only contracts they manage**

There is no shared operating view because freight is not planned as a network.

Why collaboration has historically failed

The industry has attempted collaboration through bilateral and trilateral arrangements. Shippers have partnered with each other on complementary routes. Carriers have attempted shared execution across limited pools.

These efforts consistently fail because contracts cannot support collaboration at scale.

The moment one participant deviates from plan, questions of cost allocation, benefit sharing, and liability arise. These questions cannot be resolved dynamically through contractual negotiation. Collaboration becomes fragile and slow rather than adaptive. As a result, collaboration remains limited and difficult to sustain.

The Orchestrated Collaboration™ model

Orchestrated Collaboration™ reframes coordination as a system function rather than a contractual one.
In this model:

Information is shared across the network through a neutral orchestration layer

Planning occurs at the network level, rather than the contract level

Allocation decisions are system-driven rather than negotiated

Participants benefit from the network without becoming dependent on one another

The orchestrator does not own demand or supply. It aligns them dynamically.

What Orchestrated Collaboration™ unlocks

When coordination is system-led, multiple outcomes emerge simultaneously:

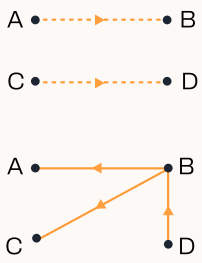
- **Higher utilization through network-level planning**
- **Structural reduction in empty miles, as demand and supply are planned to minimize repositioning rather than optimized independently**
- **Reduced volatility in capacity availability**
- **More predictable pricing dynamics**
- **Greater reliability for shippers**
- **More stable earnings for carriers**

Crucially, these benefits compound as the network grows. Each additional participant strengthens the system rather than adding fragility.

In highly fragmented markets, pooling demand and supply across shippers, lanes, and regions reveals return legs and cross-lane flows that are invisible at the contract level. In deployments of this operating model in India, network-level planning has demonstrated the ability to reduce empty miles running from 30–35 percent to below 10 percent, without renegotiating contracts or altering carrier behavior. The reduction comes from treating demand and supply as a shared system rather than as parallel transactions, materially reducing structural repositioning waste*.

Lane-focused planning with demand and capacity isolated.

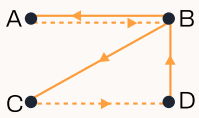
Trucks return empty after each lane



Empty miles: 30–35%

Network-level planning with pooled demand and capacity

Continuous asset circulation across connected lanes



Empty miles: <10%

Scale becomes valuable only when activated through Orchestrated Collaboration™.

However, as networks grow, coordination alone cannot sustain these gains. Planning decisions must be translated into continuous execution across changing conditions, or the benefits of coordination begin to erode.

This shifts the constraint from coordination to intelligent execution.

Deployment results based on SemiCab internal network operations in India.

PART 3: THE SYSTEM ADVANTAGE

Why an intelligent execution layer is non-negotiable at national scale

Truckload freight planning remains largely manual. Matching, routing, forecasting, and exception handling are often performed by human operators supported by fragmented tools.

Manual systems scale linearly with headcount. Network complexity grows far faster.
At national scale, manual coordination breaks down under demand variability, geographic dispersion, seasonality, and multi-party dependencies. Decision latency increases. Exceptions accumulate. Throughput stalls.

The role of the intelligent execution layer

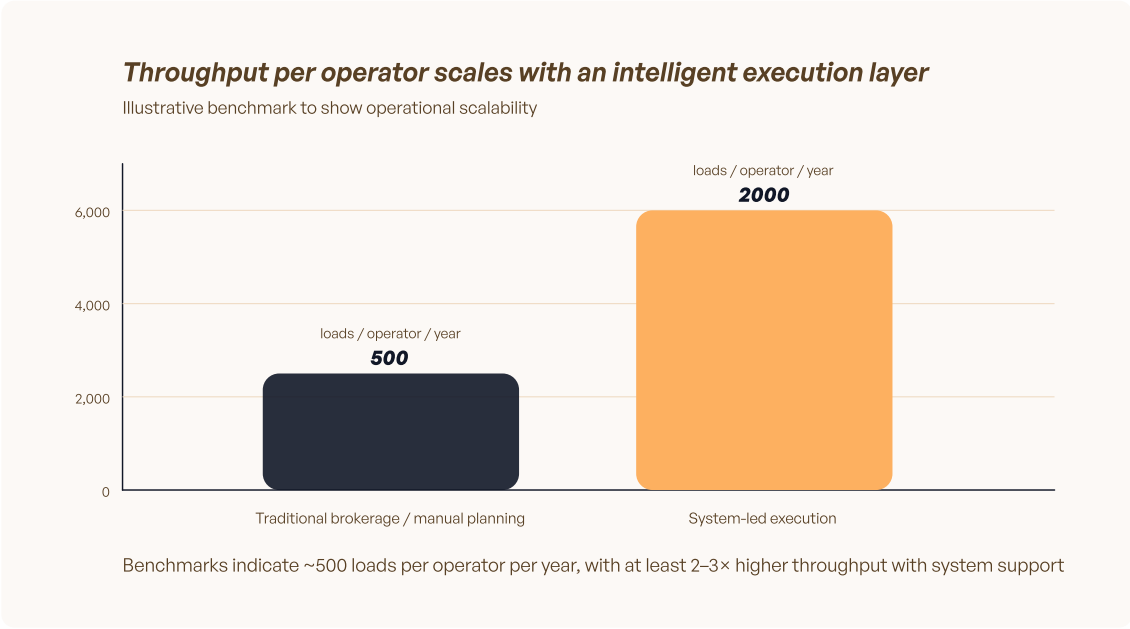
A high-performing freight network requires process intelligence at the system level, with continuous operational decision making.
This includes the ability to:

Continuously evaluate and rebalance asset positioning across the network	**Plan round trips across multiple shippers and regions**	**Anticipate demand–supply mismatches before assets become stranded**
Assign capacity to maximize utilization while reducing empty miles	**Detect and resolve exceptions without manual escalation**	**Maintain throughput without proportional growth in headcount**

This is not an automation layer added on top of operations. It is the execution system that allows orchestrated collaboration to function at scale.
Without continuous execution decisions, empty miles re-enter the system as conditions change. The intelligent execution layer exists to prevent that reversion by correcting misalignment before assets run empty.

Throughput as proof of intelligence

One of the clearest indicators of system intelligence is throughput per operator.
In most markets throughput per operator is a critical indicator of system viability.
Traditional brokerage and manual planning models typically plateau at **close to 500 loads,** beyond which service quality degrades. Systems supported by an intelligent execution layer can sustain at least **2–3× higher throughput** per operator with greater consistency, by absorbing execution decisions within the system rather than escalating them to human intervention. In production deployments, this has translated into operators handling more than 2,000 loads per year without a corresponding increase in operational headcount. This prevents coordination gains and empty-mile reductions from being eroded by execution bottlenecks.



This difference is driven by architecture, not effort.

The compounding effect

When an intelligent execution layer supports orchestrated collaboration at scale, efficiency compounds.

- **Networks become more predictable as they grow**
- **Empty miles decline structurally rather than episodically**
- **Utilization improves without increasing volatility**
- **Reliability increases across participants**

> **This reverses traditional freight economics, where growth often introduces instability, converting coordination into sustained, compounding performance.**

What this model enables

Taken together, these three elements form a new operating model for freight:

- **Scale establishes density**
- **Orchestrated Collaboration™ converts density into efficiency**
- **The Intelligent Execution Layer sustains and compounds performance**

This model delivers clear benefits:

For shippers

Lower total logistics cost, predictable capacity, reduced operational risk

For carriers

Higher utilization, more stable earnings, reduced waste

For the ecosystem

Lower systemic inefficiency, improved asset productivity, more resilient supply chains

WHY THIS MODEL IS GLOBALLY RELEVANT

The operating model described here is not specific to any single geography. The same structural dynamics shape truckload freight systems globally.

Disconnected planning, local optimization, and manual execution produce similar outcomes regardless of market maturity. The difference lies not in infrastructure or regulation, but in operating models.

A model that converts scale into coordination, and coordination into sustained execution, applies wherever freight is organized as a network rather than as isolated transactions.
Freight efficiency does not emerge from incremental optimization. It emerges when disconnected transactions are planned, executed, and continuously rebalanced as a coordinated system.

When scale, Orchestrated Collaboration™, and an intelligent execution layer work together, empty miles decline structurally rather than episodically. This marks a shift to better network economics, where utilization improves, volatility falls, and value compounds across the ecosystem.

That is the network advantage.

SOURCES & INDUSTRY CONTEXT

This paper draws on a combination of industry research, public policy reports, and internal network deployment experience. Key sources informing the broader structural context include:

National Institutes of Health (PMC). Structural inefficiencies in road freight transport and empty mileage. 2023.
https://pmc.ncbi.nlm.nih.gov/articles/PMC9261175/

NITI Aayog. Transforming India's Logistics Ecosystem. Government of India.
https://www.niti.gov.in/sites/default/files/2023-02/Freight_report.pdf

DPIIT–NCAER. Logistics Cost in India Report. Ministry of Commerce and Industry.
https://m.economictimes.com/news/economy/indias-logistics-costs-at-7-97-of-gdp-air-transport-most-expensive-dpiit-ncaer-report/articleshow/124121696.cms

Network performance outcomes referenced in this paper are based on SemiCab internal deployments in India.