



The Future is Now

**Why TMS are Indispensable**

to Growth in Logistics

---



## Introduction

From the Model T to the supercars of today, or from the scythe to the modern-day harvesters, the evolution of technology has repeatedly changed the face of industries and opened gates to new growth opportunities.

So transformational is the impact of such advancement that historians refer to these periods as 'Industrial Revolutions'. The rapid pace of digitization on the back of Artificial Intelligence (AI) and Machine Learning (ML) has been powering the current Fourth Industrial Revolution. It has also been changing the face of many industries, and logistics is no exception.

The principal technology that powers logistics -- Transportation Management Software (TMS) -- has leapfrogged in its scope, efficiency, and applicability in less than a decade. So much so that stakeholders in the industry are finding TMS to be indispensable to their operations.

This can be seen from the growth of the TMS market, which is **projected to grow from \$7.7 billion to \$17.8 billion from 2020 to 2025 at a Compound Annual Growth Rate (CAGR) of 18.2%.**

Often, it is a combination of internal and external factors that spur innovation and growth. In the case of the evolution of TMS, the factors range from the improved viability of adopting Artificial Intelligence (AI) and Machine Learning (ML) to the exponential rise of e-commerce adoption during the pandemic.

This white paper aims to trace the evolution of TMS in the past decade and shed light on the factors that have been contributing to its growth. It will also analyze the rate of adoption of state-of-the-art TMS among stakeholders in the logistics industry, and a few things companies must know before onboarding a TMS to make them future-ready.

Finally, the white paper will look at some of the trends that are currently influencing the development of TMS technology today and mention some projected trends that will define its future trajectory.



### Key Insights

The TMS market is projected to grow from \$7.7 billion to \$17.8 billion from 2020 to 2025 at a Compound Annual Growth Rate (CAGR) of 18.2%.

## The whirlwind journey of TMS

Broadly speaking, TMS is any software that improves the efficiency of key functions across a supply chain. Right from the selection of a carrier to the creation of shipping plans and delivery routes, these key functions were largely manually carried out up and till the 2010s.

However, the idea and application of TMSs have been in the making for *many decades* past. The earliest TMS were operated on bulky Cathode-ray Tube (CRT) monitors and powered by large mainframes. Their applicability was largely restricted to rate management, load consolidation, and facilitating communication with carriers. Such solutions were not widely adopted due to the prohibitive costs of implementing the technology, and the nascency of the market (such applications being developed largely in-house).

## TMS 4.0: How we got here

01

### The 80s: The Early TMS

- Bulky mainframes

#### Abilities:

- Rate management
- Load consolidation
- Communication



02

### The 90s

- On-site client/ server systems
- Improved usability with GUI

#### Added abilities:

- Cross-docking
- Multi-modal routing
- Fleet routing and optimization



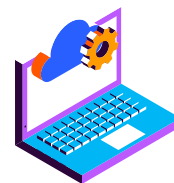
03

### The present

- Cloud-based applications

#### Added abilities:

- Visibility across the supply chain
- Carrier recommendation
- Real-time fleet routing and optimization
- Automation of shipper assignment





The 90s saw technology boosting the viability of a TMS with the affordability of on-site client/server systems that brought along faster processing speeds, and the improved usability of graphic-user-interface (GUI), which forms the bedrock of the user experience in applications even today. By the 2000s, TMS developers, both in-house and specialists, increased the scope of applicability to include features like cross-docking, multi-modal routing, fleet routing and optimization, and carrying out freight payments.

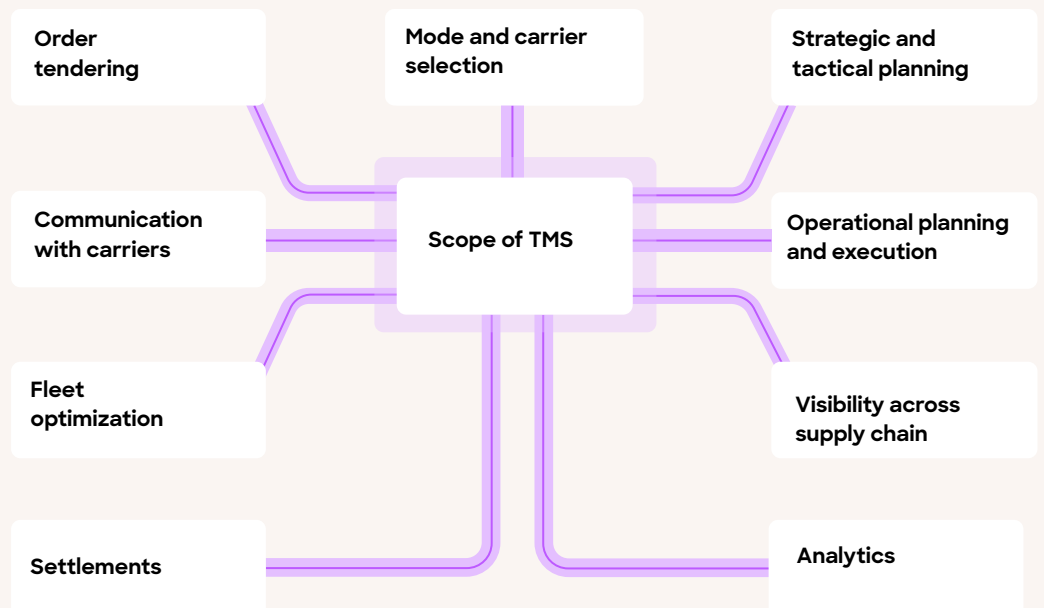
However, it is only in the recent five years that the adoption of TMS really gathered steam. The adoption of cloud-based TMS applications lifted the burden of costs and processes associated with maintaining servers and updating the application itself. More importantly, technologies such as AI/ML have brought a whole new spectrum of visibility to the overall operations.

## The scope of TMS today



### Key Insights

From automated order consolidation and assignment to route optimization, modern TMSes have tremendously expanded in scope and applicability.

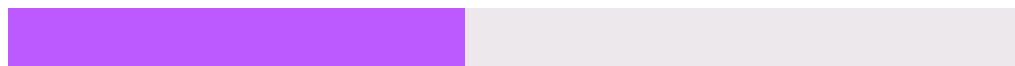


TMSes of today offer shippers the ability to: automate the assignment of shipments to carriers; gain visibility on the ETA of shipments through predictive analytics that factors in traffic conditions, weather, speed of the vehicle, etc.; optimize route planning; carry out the live monitoring of shipments; the settlement of payments; the ability to immediately secure Proof of Delivery (PoD); and receive customer feedback, among other benefits. More about the technology drivers of the modern TMS in the next chapter.

## What's driving the growth of the TMS market?

### The projected growth of global supply chain management market

Estimated value in 2020



Projected growth by 2026



Source: Statista

For most of its history, the development of TMS was largely restricted to established software developers, consultants, and big players in the logistics industry that developed in-house TMS solutions. This, coupled with the restrictive capital investments that came with developing and adopting such software, meant that the TMS market has only been seeing significant growth in market size and scope in the last decade.

According to [estimates](#), the global supply chain management market, which includes the TMS market, stood at \$15.85 billion in 2020 and is estimated to grow to \$31 billion in 2026.



Below are the main factors that are responsible for the growth of the TMS market:

## Key growth drivers



Cloud  
technology



AI/ML



Innovation by  
diverse  
players



E-commerce



# 01

## THE RISE OF CLOUD COMPUTING

When it comes to providing long-term value to customers across a range of industries, cloud technology, and its allied services, have taken center stage. According to [reports](#), the global market value for public cloud computing, where multiple entities can share the computing resources of a single cloud services provider over the internet, is expected to reach \$482 billion by 2022.

According to a [survey](#) of supply chain professionals carried out by Oracle and Peerless Research Group (PRG), 70% of the respondents felt that cloud technology was going to have a significant impact on growth.

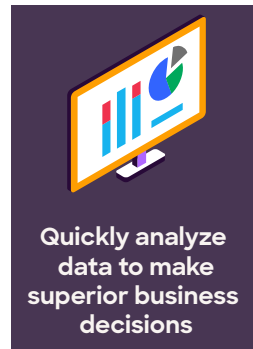
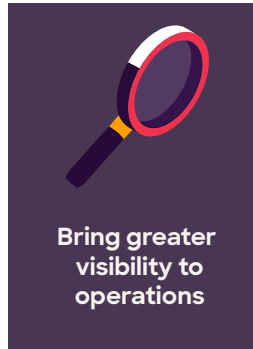
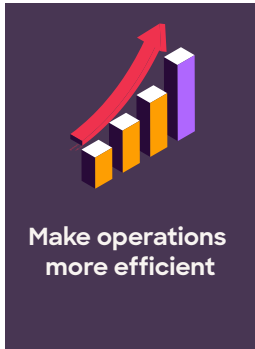


### Key Insights

Global market value  
for public cloud  
computing \$482  
billion by 2022.

Source: Statista

## More than 45% of supply chain professionals surveyed look to onboard TMS to:



Source: 'Is Logistics at a Tipping Point for Cloud and Emerging Technology Adoption?' survey by Oracle and Peerless Research Group (PRG)

Another reason that is propelling the success of the cloud is its cost-effectiveness. Developers running their applications on the cloud operate on a pay-as-you-go model. This frees them from committing to any IT infrastructure investments and also frees their customers from initiating any subsequent upgrading and maintenance on the same. Developers then pass on these benefits to their customers by providing their services in an affordable subscription-based model and provide regular upgrades and new functionalities that can cater to the fast-evolving needs of any industry.

## 02

### THE DIVERSIFICATION OF THE MARKET

On the developer's end, the maturation of cloud technology services has leveled the playing field in the TMS market. No longer do developers have to worry about making massive capital investments into IT infrastructure before building solutions. Given the flexible nature of the cloud, TMS developers, right from enterprising startups to established players are at liberty to develop products on the fly, and experiment and test them in contained environments before their launch -- all of which also improve their go-to-market speeds.



## Key Insights

TMS market largely consists of four types of players that operate at five levels of complexity: Leaders, Challengers, Visionaries, and Niche Players.

Source: Gartner

With increased competition comes increased opportunities for innovation and disruption. And when such innovation takes place in a high-stakes, critical industry such as logistics, investors see a golden opportunity. **From 2015-2019, venture capitalists globally have invested close to \$28 billion in logistics-based startups**, many of whom are providing TMS-managed services. With e-commerce providing strong tailwinds to the industry in recent times, VC interest in the industry continues to grow, with a [slew of major deals](#) that are making the headlines. All of this is enabling further diversification and competition.

According to [Gartner Magic Quadrant for Transportation Management Systems](#), the TMS market largely consists of four types of players that operate at five levels of complexity: Leaders, Challengers, Visionaries, and Niche Players. Leaders are characterized by their strong, and diversified product offerings that can even handle operations on a global scale; a long and proven track record of customer satisfaction; a consistent ability to grow and retain clients; and are often thought leaders in the space.

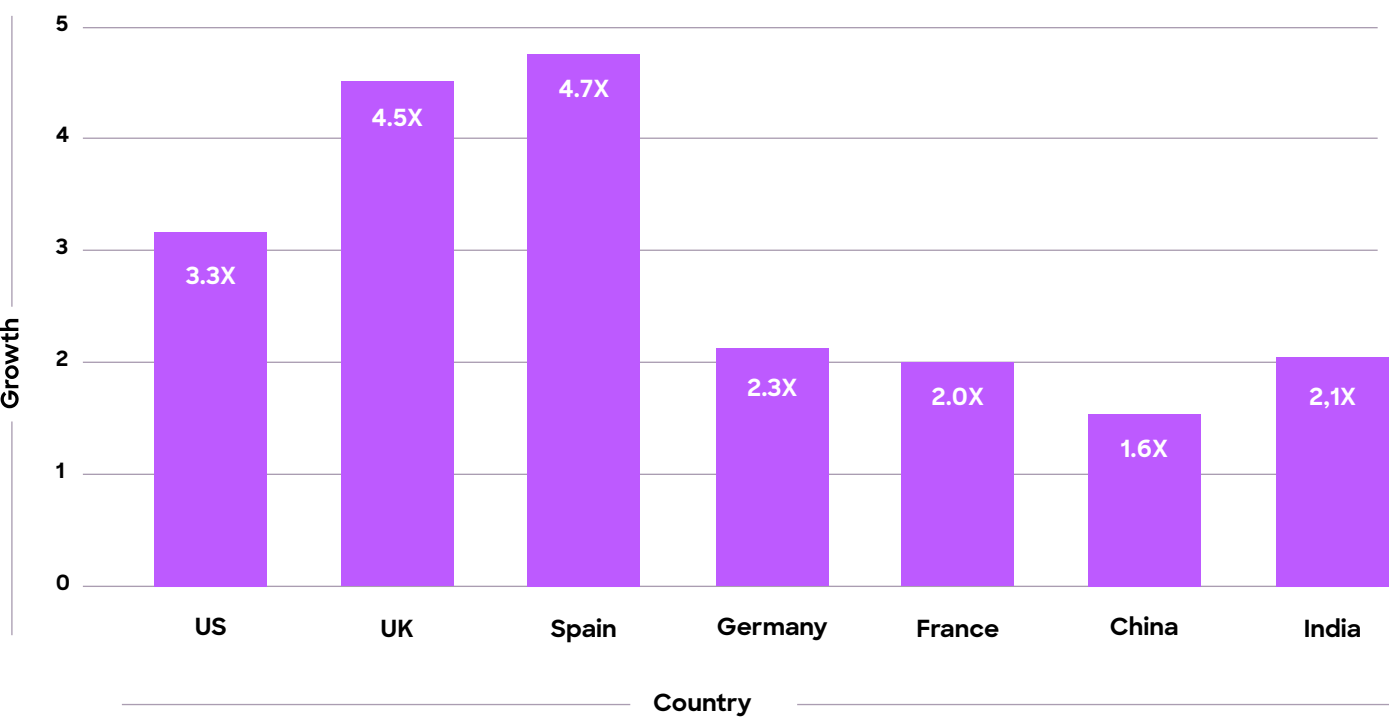
Challengers have solid TMS offerings and a strong record but are yet to reach the level of sophistication and vision for their products as seen by Leaders. Visionaries have the ability to innovate beyond the basic functionalities of a TMS and shape the nature of disruption. Whereas Niche Players look to capitalize on meeting the requirements of a variety of shippers having specific requirements such as non-American shippers, and those operating at a smaller scale and lower complexity. Given the frenetic pace of innovation and developments taking place in the industry today, only time will tell whether the above-mentioned composition will change in the near future.

# 03

## THE E-COMMERCE BOOM

The convenience that e-commerce brings to the shopping experience has meant a healthy increase in the market globally. The onset of the coronavirus pandemic drastically altered consumer behavior, largely due to irregular patterns of travel restrictions, lockdowns, and the enforcement of social distancing norms. As a result, there was an [exponential increase](#) in the number of consumers purchasing their products through e-commerce portals.

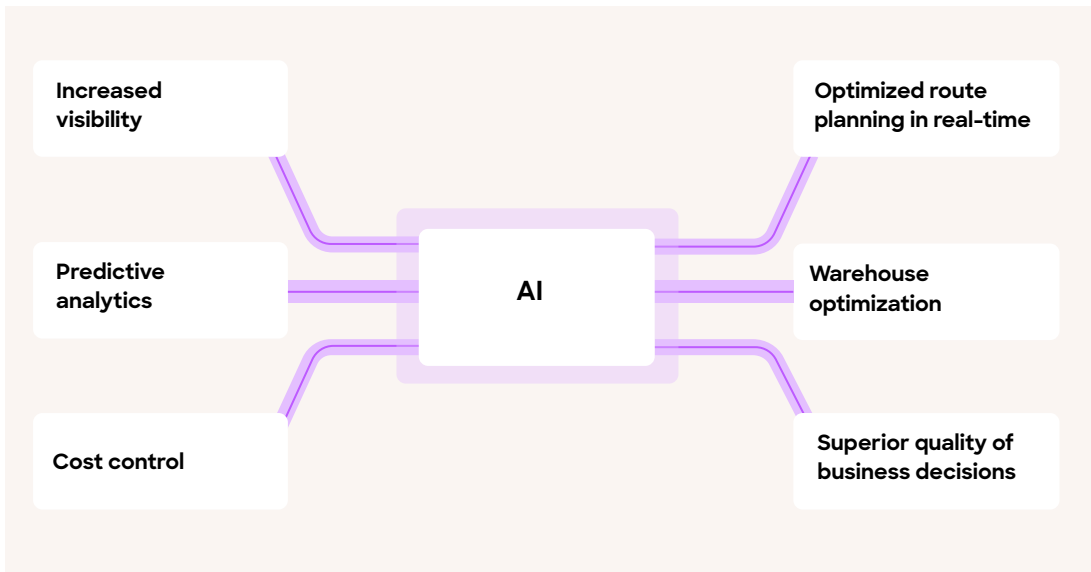
# Year-on-year growth of e-commerce sales as a percentage of total sales in 2020



According to estimates, the increase in e-commerce deliveries that was expected in 10 years, took place in a matter of eight weeks in 2020.

And the popularity of e-commerce is likely to sustain for the foreseeable future. According to [McKinsey Consumer Pulse](#) surveys undertaken by the firm, close to 75% of people that are using digital channels for the first time will continue to do so even after normalcy is restored. When it comes to establishing market share in a highly competitive, low-margin industry like e-commerce where the scope for product differentiation is minimal, it is essential to provide a superior customer experience across all touchpoints. Leading e-commerce retailers like Amazon realized this early on, and have been creating AI-powered TMS [to optimize their first, middle, and last-mile deliveries](#). In fact, as a result of its innovations, Amazon has been one of the earliest e-commerce players to offer same-day and two-day shipping, making TMS in the e-commerce sector indispensable to staying competitive.

## The scope of TMS today



Up and till the beginning of the last decade, the exploration of the potential of AI/ML was largely confined to academia. Over a period of time, incremental advancements in technology allowed a few businesses to experiment with the new-age technology. One of the most prominent examples being Amazon, which was an early adopter of AI/ML to [ensure](#) highly personalized product recommendations to its customers.

On seeing the success of such enterprises in adopting AI/ML, other companies soon began to follow suit. A survey of supply chain companies by McKinsey showed that early adopters of AI-powered supply chain management have seen an [improvement](#) of **service and inventory levels by 65 and 35% respectively, and a reduction of logistics costs by 15%.**

In recent years, this has also helped with the adoption of cloud service providers providing AI/ML-based services that could be readily integrated into applications that developers would be working on. This, combined with the increased pressure to maintain high levels of customer satisfaction, lower costs and improve productivity after the onset of the coronavirus pandemic, have contributed to the increased sophistication and adoption of TMS. So much so that the market for AI in the supply chain technology market is [projected](#) **to grow to \$21.8 billion by 2027 at a CAGR of 45.3% by 2019.**

## Under the hood: A look at technology trends powering TMS

The contribution that TMS has made to improving the efficiency of supply chain operations has vastly increased with technological advancements over the years. Here are the key trends that are powering the growth of TMS today:

### Internet of Things (IoT)

The essential principle of IoT is that devices can be programmed to communicate with each other and send and receive data with the help of the internet. This has enormous implications in supply chain management and logistics as it provides a level of visibility hitherto unseen in the industry. With the help of IoT, companies can [oversee](#) the progress of deliveries and take action in real-time to ensure that service level agreements (SLAs) are maintained as closely as possible. The end-customer can also gain visibility on the status of their delivery and be informed of any delays with the help of such applications.

### Automation

With the help of AI/ML, state-of-the-art TMSs can now automate vital functions of the supply chain to reduce costs and improve efficiency. A clear example of this can be seen in last-mile deliveries, where two-day and same-day deliveries are rapidly becoming the norm. On the basis of certain delivery parameters, a TMS can quickly create a day plan for [delivery executives](#) or [sales beat executives](#) that optimize the number of trips in the shortest possible distance. All while saving on fuel and ensuring that the SLAs for the respective deliveries can be met. It can also take care of repetitive tasks that free up personnel to take focus on more value-added activities.

### Predictive Analytics

This is another ability that is possible due to AI/ML-backed TMSs. By analyzing and learning from massive volumes of past data, a TMS can provide alternate routes to delivery executives facing traffic, and recommend the optimal way for vehicles to load their deliveries. Other supply chain-based applications, backed by AI/ML, can even run [‘what-if’ scenarios](#) that can help in the creation of optimal greenfield or brownfield supply chain networks.

## Blockchain

Because of its ability to safely update data with high fidelity across all the nodes of a server, blockchain is being utilized by TMSs to bring visibility to operations to all stakeholders of a complex supply chain network. The technology is being worked with to bring integrations between shippers, carriers, and the end-customer. It could also have the [potential](#) to improve coordination between land, sea, and air channels to further optimize the entire supply chain network.

## Conclusion

With the global business environment being in constant flux and consumer expectations higher than ever, it is imperative that logistics operations are calibrated to work as optimally as possible. It is for this reason that TMSs have become indispensable to supply chains, especially as they continue to grow in scale and complexity. TMSs have come a long way over the decades, thanks to technological advancements such as AI, ML, and IoT, among others. However, TMS will continue to evolve in scope as they continue to be backed by innovative technologies. [Industry experts](#) hope that as technologies such as blockchain and nanotechnology continue to mature, they could herald the new age of TMSs.

And while much has been said about the widespread benefits of AI/ML-powered applications such as TMSs, it must be noted organizations cannot adopt such technologies with a one-size-fits-all approach. That is because every supply chain is uniquely defined by its location, scale, and even cultural context, among other factors. It is also the reason why the TMS market at present is also drastically changing, with several players catering to the unique niches that are formed within this complex industry. This makes it a top priority for organizations to partner with a TMS provider with a strong and proven track record of providing scalable, customizable TMS solutions that can be easily integrated into one's existing operations. The right TMS is essential for supply chains to capitalize on short-term trends, and help achieve long-term growth.

## Sources

<https://www.chainalytics.com/tms-how-to-about-transportation-management-systems/>

<https://www.themanufacturer.com/articles/the-evolution-of-transport-management-systems/>

<https://www.oracle.com/in/scm/what-is-transportation-management-system/>

<https://www.statista.com/statistics/1181996/supply-chain-management-market-size-worldwide/>

<https://www.statista.com/statistics/273818/global-revenue-generated-with-cloud-computing-since-2009/>

[https://www.oracle.com/explore/c/oracle-scm-logistics?x=Wi4ZEU&lx=UkjAZI&elqTrackId=27bdcf669ae6498189491e84f54d8bae&elqaid=108058&elqat=2&source=ad:pas:go:dg:a\\_apac:71700000086725885-587000007378429942-p66093469790:RC\\_WWMK160606P00145C0029:SPtest](https://www.oracle.com/explore/c/oracle-scm-logistics?x=Wi4ZEU&lx=UkjAZI&elqTrackId=27bdcf669ae6498189491e84f54d8bae&elqaid=108058&elqat=2&source=ad:pas:go:dg:a_apac:71700000086725885-587000007378429942-p66093469790:RC_WWMK160606P00145C0029:SPtest)

<https://www.mckinsey.com/~media/mckinsey/industries/travel%20logistics%20and%20infrastructure/our%20insights/startup%20funding%20in%20logistics/startup-funding-in-logistics-new-money-for-an-old-industry.pdf>

<https://www.mckinsey.com/business-functions/mckinsey-analytics/our-insights/reimagining-your-business-for-ai>

<https://www.mckinsey.com/featured-insights/future-of-work/the-future-of-work-after-covid-19>

<https://www.businessinsider.in/thelife/news/logistics-startups-are-enjoying-a-historic-funding-boom-heres-what-13-recent-deals-say-about-where-the-industry-is-headed-/articleshow/85836299.cms>

[https://www.oracle.com/explore/c/gartner-quadrant-transportation?x=Wi4ZEU&lx=UkjAZI&elqTrackId=27bdcf669ae6498189491e84f54d8bae&elqaid=108058&elqat=2&source=ad:pas:go:dg:a\\_apac:71700000086725885-587000007378429942-p66093469790:RC\\_WWMK160606P00145C0029:SPtest](https://www.oracle.com/explore/c/gartner-quadrant-transportation?x=Wi4ZEU&lx=UkjAZI&elqTrackId=27bdcf669ae6498189491e84f54d8bae&elqaid=108058&elqat=2&source=ad:pas:go:dg:a_apac:71700000086725885-587000007378429942-p66093469790:RC_WWMK160606P00145C0029:SPtest)

<https://www.forbes.com/sites/blakemorgan/2018/07/16/how-amazon-has-re-organized-around-artificial-intelligence-and-machine-learning/?sh=22dc61777361>

<https://www.globenewswire.com/news-release/2020/06/03/2042904/0/en/Artificial-Intelligence-AI-in-Supply-Chain-Market-is-projected-to-reach-21-8-billion-by-2027-Growing-at-a-CAGR-of-45-3-from-2019-Meticulous-Research-Analysis.html>

<https://www.npr.org/2018/11/21/660168325/optimized-prime-how-ai-and-anticipation-power-amazons-1-hour-deliveries>

<https://www.forbes.com/sites/forbestechcouncil/2021/01/26/the-future-of-the-commoditized-tms/?sh=78b6d33e14c1>

<https://www.oracle.com/in/scm/what-is-transportation-management-system/#link8>



Locus is a leading-edge technology company  
dedicated to solving the most challenging all mile  
problems in global logistics.

**1020m+**

Total deliveries  
optimized

**12m+ kgs**

Reduction  
in GHG emissions

**\$288m+**

Savings  
in logistics costs

**GROWTH,  
DELIVERED.**

[Know more](#)