EXECUTIVE SUMMARY

The Digital Transformation of Transportation and Logistics

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Executive Summary

Transportation and logistics (T&L) faces three primary challenges:

- Visibility – The ability to track/monitor goods in real time.

- Agility – Expedited delivery demands from digital consumers.

- Sustainability – Reduction of emissions while leveraging fast modes of freight, such as aviation.

Digital transformation (DX) serves as a tool for tackling T&L's issues. Our analysis highlights several digital use cases in exploration in T&L, chiefly led by startups and tech players. We also observe these solutions have an equal impact on various other sectors such as automotive, oil and gas, and pharmaceuticals.

Moving forward, the rise of DX will create a threat for incumbent logistics service providers from tech giants and startups, and a subsequent pivot from asset ownership to service business models for logistics.

Players should remain cognizant of the transformation in T&L and prepare their supply chain functions accordingly for future logistics partnerships.

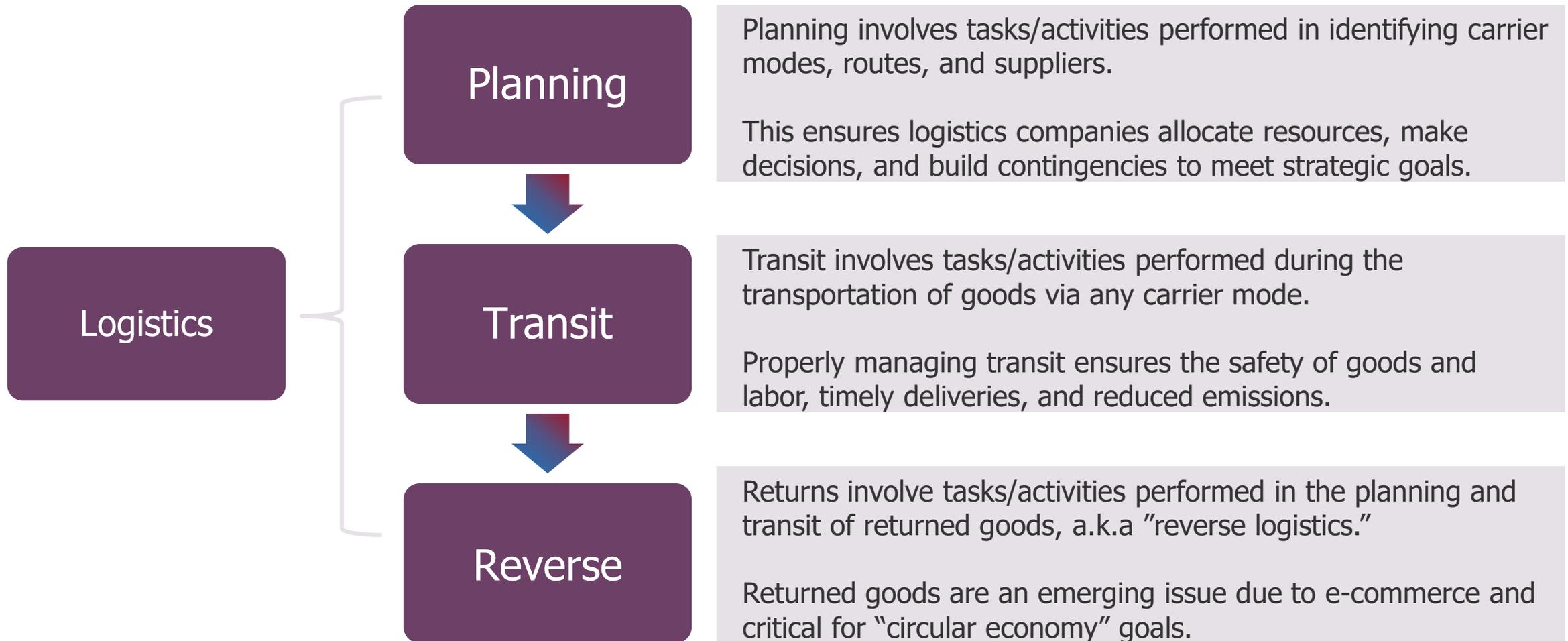**THE TRANSFORMATION OF LOGISTICS PLAYERS**
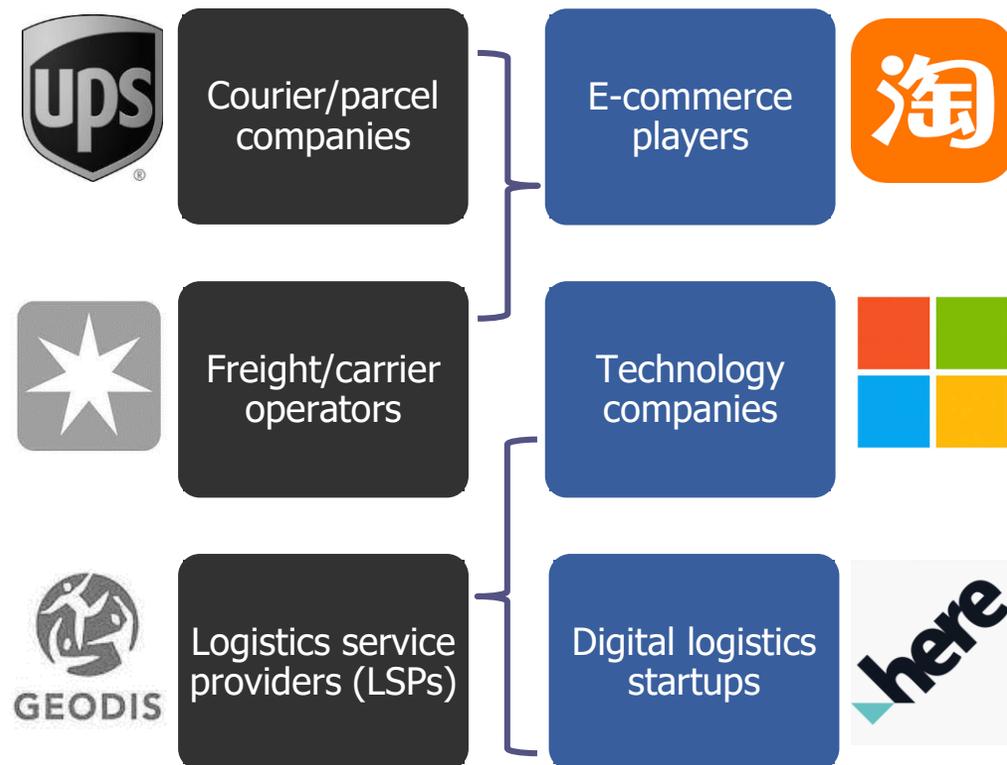
Digital transformation offers a proven route to logistics for resolution, similar to adjacent sectors

Across industries, digital transformation chiefly serves as a transformation tool that plays into the fundamental challenges affecting that industry. For logistics, DX will act as a resolution for tackling its three pain points around visibility, agility, and sustainability. The table below gives examples of different industries where digital technologies have addressed industry-specific challenges.

Industry	Core Challenges	Further Reading
Power	The energy transition makes managing the power grid increasingly complex as renewables and distributed generation grow.	The Digital Transformation of Power
Healthcare	Rising healthcare costs, an aging population, and sociodemographic shifts strain today's healthcare provider-centric model.	The Digital Transformation of Healthcare
Food	Consumers demand more personalized experiences, traceability and transparency, and easier ways to shop.	The Digital Transformation of the Food Industry
Oil & gas	Volatile oil prices, pressure to reduce greenhouse gas emissions, changing geopolitics, and an aging workforce have put pressure on O&G companies' bottom line.	The Digital Transformation of Oil and Gas

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The use cases are organized around three segments of the logistics value chain – planning, transit, and returns

Logistics

Planning

Planning involves tasks/activities performed in identifying carrier modes, routes, and suppliers.

This ensures logistics companies allocate resources, make decisions, and build contingencies to meet strategic goals.

Transit

Transit involves tasks/activities performed during the transportation of goods via any carrier mode.

Properly managing transit ensures the safety of goods and labor, timely deliveries, and reduced emissions.

Reverse

Returns involve tasks/activities performed in the planning and transit of returned goods, a.k.a "reverse logistics."

Returned goods are an emerging issue due to e-commerce and critical for "circular economy" goals.

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Forecasting

WHAT IT IS FOR LOGISTICS

Forecasting is the use of analytics tools to predict a future value. Forecasting is used in logistics planning for predicting supply/demand trends, delivery/shipment timelines for better load distribution, and inventory planning.

LOGISTICS PAIN POINTS

Forecasts cater to unpredictable circumstances in weather, politics, and trade embargoes. The data for forecasting, however, is predominantly paper-based and in different formats while seated in silos.

WHAT IT ACHIEVES

Uncover Invisible Insights	Upskill Humans
Predict the Future	Make Information Accessible
Optimize	Automate

KEY PLAYERS

clearmetal

TRANSMETRICS

PROWLER.io
the decision company

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Forecasting

EXAMPLE CASE STUDIES

SynerGLabs builds AI-enabled demand forecasting tools for Australian electronics logistics company.

DNV GL builds a service for forecasting future "port of calls" for ships and ETA.

Portcast builds demand forecast models by integrating dynamic pricing alongside vessel and container locations.

IMPORTANCE TO LOGISTICS

MODERATE

LEVEL OF INNOVATION ACTIVITY

MODERATE

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Forecasting is an important digital use case in logistics planning for reduced downtime and max asset utilization. However, it has a marginal impact on lowering emissions. Despite moderate startup activity, forecasting has yet to see a foray of startups that work toward digitization of historic datasets via emerging technologies like natural language processing (NLP).

Forecasting Case Study – Predicting ship arrivals at ports

INTRODUCTION

Ships spend up to three days at port berths for unloading/loading. This number, however, varies with port and ship conditions. Due to a lack of accurate forecasts, shippers commit to longer delivery timelines to avoid late deliveries and demurrage costs.

USE CASE

To estimate ship latency periods at berths, Spire and ClearMetal partnered to analyze data lakes of ship EDI messages that offer details on ship status – waiting for preferred berth, ready for unloading, waiting for hauler, etc. Using unsupervised clustering algorithms, the duo analyzed 2 billion ship satellite data points for 3,000 berth locations. The model correlates the vessel type, berth type, and port capabilities with historic time spent by ships on berths.

KEY PLAYERS

LUX TAKE

Via ClearMetal's model, shippers can commit to reasonable delivery targets and save up to 50% in demurrage. Clients should view the case study as an example of the incremental gains digital brings in logistics due to its inherent inefficiencies.

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Personalization

WHAT IT IS FOR LOGISTICS

Personalization develops products and recommendations based on an application's unique characteristics and preferences. In logistics transit, it is used for vehicle spare parts, routing networks, and capacity utilization.

LOGISTICS PAIN POINTS

Aspects of logistics, such as reverse logistics and last-mile, that interface with end customers require customized processes/products to gain competitive edge. In marine, this is driven by reducing downtimes and operational costs.

WHAT IT ACHIEVES

Uncover Invisible Insights	Upskill Humans
Predict the Future	Make Information Accessible
Optimize	Automate

KEY PLAYERS

TRANSMETRICS   TruMarine

Wilhelmsen   DHL

DYNALOG!C
PERSONALIZED LOGISTICS

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Personalization

EXAMPLE CASE STUDIES

Wilhelmsen Group 3D prints customized scupper plugs and delivers them to Berge Bulk's vessel, claiming 54% reduction in the part's overall life cycle emissions.

Dynalogic designs a personalized logistics network for Decathlon to deliver large-sized, fragile transshipments.

IMPORTANCE TO LOGISTICS

MODERATE

LEVEL OF INNOVATION ACTIVITY

LOW

LUX TAKE

Personalization holds a niche number of applications in logistics, which is reflective of lower startup activity. However, it offers the potential of expediting processes and also reducing emissions. The space is relatively open, with few service providers offering personalization solutions outside route optimization and 3D printing of parts.

Personalization Case Study – Printed nozzle rings for ships

INTRODUCTION

Nozzle rings are a part of marine turbochargers that increases onboard engine efficiency. Due to premature erosion, nozzle rings frequently fail and are replaced by flying in a spare part to the ship, with the damaged part subsequently disposed of.

USE CASE

In order to save lead time and costs associated with ordering a new nozzle ring, an undisclosed shipping company partnered with TruMarine. TruMarine uses 3D printing for reconditioning of nozzle rings by placing printers at strategic ports. Using patented metal printing, TruMarine repairs the damaged part, eliminating the need for buying and flying in a brand new nozzle ring for the turbocharger.

KEY PLAYERS

TruMarine

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The use of onboard printers in marine has long been discussed. However, such projects have generally failed for various reasons. Clients should view TruMarine's approach of placing printers at specific ports as a useful avenue for scaling printing in shipping.

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Summary: Autonomous operations is the most influential digital use case in logistics

DIGITAL USE CASE	CORE OUTCOMES ENABLED BY DIGITAL TRANSFORMATION						IMPORTANCE TO LOGISTICS	LEVEL OF INNOVATION ACTIVITY
	Uncover Invisible Insights	Predict the Future	Optimize	Upskill Humans	Automate	Make Information Accessible		
Planning								
Forecasting		■					Moderate	Moderate
Scenario optimization		■					Moderate	Moderate
Digitization				■		■	Low	High
Optimized operations			■				Moderate	Low
Transit								
Autonomous operations	■		■		■		High	High
End-to-end visibility						■	Moderate	Moderate
Asset monitoring						■	Low	High
Personalization	■		■				Moderate	Low
Reverse								
Scenario optimization		■					Moderate	Low
Digitization				■		■	Low	Moderate

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Moving forward, as DX scales in the industry, new business models will emerge while e-commerce players consolidate

As digital maturity in logistics rises, traditional logistics companies will look toward new business models and go assetless: The logistics business, as things stand today, is highly asset-centric. Almost all logistics companies, be it vessel owners like Maersk or courier companies like DHL, own massive fleets that contribute to significant capital and operational costs. As the use of digital technology in the industry garners more momentum, companies will gain higher visibility into operations and consumer trends while achieving full autonomy, gradually reaching a stage where they can experiment with new service-based business models. Such models will not only enable a higher degree of flexibility for these companies but also reduce their GHG emissions in the future. An example of this trend is the rise of startups like Haulio (considered the Uber of trucking), which hauls cargo for shippers without owning any trucks, and the entry of Uber itself via Uber Freight.

A crowded outlook for e-commerce players could trigger consolidation in logistics to build competitive edge: E-commerce is one of the fastest-growing industries across the globe, with a long list of heavyweights including Alibaba, Amazon, and Flipkart. As the competition among these players continues to escalate, it is possible that they will look to consolidate in the logistics vertical to build competitive edge on each other and drive one another out of certain regional markets. For example, in 2019, Alibaba invested $3.3 billion in Chinese logistics company Cainiao as a possible avenue for driving out competitors in China. If e-commerce giants do consider consolidating in logistics, this could mean more strategic investments for logistics startups (such as JD.com's $200 million fund), with a potential future where incumbent logistics giants like DHL are acquisition targets for the likes of Amazon.

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The digital transformation of transportation and logistics

MODERN LOGISTICS STAKEHOLDERS

FUTURE LOGISTICS STAKEHOLDERS

Courier/parcel companies

Absorbed by →

E-commerce players

Freight/carrier operators

Technology companies

Disrupted by →

Logistics service providers (LSP)

Digital logistics startups
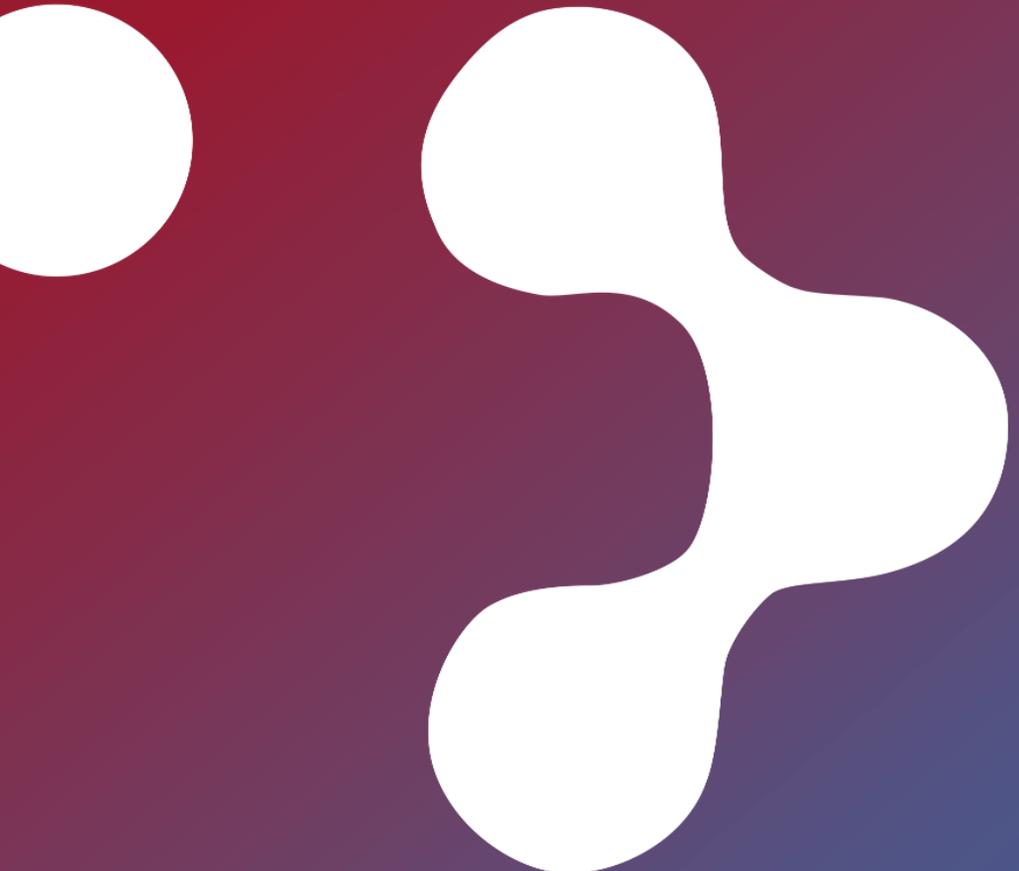
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