World Economic Forum
Digital Transformation Initiative:
In collaboration with Accenture

The digital transformation of logistics: threat and opportunity

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The digital transformation of logistics: threat and opportunity

Digitalization threatens to disrupt logistics but could also help the industry reduce its inefficiencies and shrink its environmental impact.

Since the internet revolution, more packages than ever before are being shipped, but logistics businesses should not rest easy. Logistics has introduced digital innovations at a relatively slow pace, and this could be potentially catastrophic for even the biggest players.

Digital platforms will become increasingly important, giving small companies the global reach to compete with these established giants. The race to build a dominant global platform will determine which enterprises will be the winners and losers.

With the logistics industry suffering from significant inefficiencies, digital transformation can also bring important social and environmental benefits. Industry stakeholders should take notice and come together to prioritize digital transformation initiatives.

$1.5 trillion
Value at stake for logistics industry players from digital transformation to 2025

$2.4 trillion
Potential value of societal benefits from the digital transformation of the logistics industry to 2025

Source: World Economic Forum / Accenture analysis

The Digital Transformation Initiative

The Digital Transformation Initiative (DTI) is a project launched by the World Economic Forum in 2015 as part of the Future of the Internet Global Challenge Initiative. It is an ongoing initiative that serves as the focal point for new opportunities and themes arising from the latest developments and trends from the digitalization of business and society. It supports the Forum’s broader activity around the theme of the Fourth Industrial Revolution.
Digital trends in the logistics industry

Market trends are driving growth in logistics while technological advances are opening up new ways to meet that increased demand.

**Market trends**

1. **A growing customer base**
The world’s population is expected to hit 9 billion people in 2050. Expanded internet access will mean logistics providers delivering to remote locations in emerging economies, while also negotiating the potentially gridlocked metropolises of the 41 ‘megacities’ (populations: 10+ million) that are predicted to spring up by 2030.

2. **Rise of the digital consumer**
   Smartphone subscriptions are predicted to almost double to 4 billion by 2025. As consumers get used to digital services, they expect the same quality and flexibility of service in other industries. Logistics firms will need to offer a multiplatform service.

3. **Political and economic developments**
   Like any global operation, the logistics industry is affected by geopolitical and economic developments. The three most significant are the price of oil, trade harmonization and growing concern about the environment.

4. **Performance of the logistics industry since the 2008 financial crisis**
   In 2008, the market capitalization of the biggest players fell from around $700 billion to approximately $400 billion. Since then, the performances of different segments have been mixed, but the sector as a whole has recovered.

15%

Average rate of growth of market capitalization of top logistics companies over the six years to 2014

Source: World Economic Forum / Accenture analysis

**Technology trends**

1. **The third age of the internet**
The Internet of Things is expected to grow to almost 50 billion objects by 2020. With the proliferation of mobile sensors, it has the potential to improve the industry’s efficiency and reliability. Advances in cloud computing are enabling logistics providers and customers to conduct a real-time analysis of supply chain data.

2. **Rise of the platforms**
   Giant internet platforms such as eBay and Amazon enable start-ups and small firms to operate in a global market from their first day of business. Customers benefit from having a broad range of alternative suppliers to choose from.

3. **3D printing and driverless vehicles**
   There is uncertainty about its overall impact, but 3D printing of replacement parts or products on the spot could reduce the need for parts and goods to be shipped. Autonomous vehicles could be transformational, reducing operating costs while improving the reliability of deliveries.

**The cost of 3D printing has fallen dramatically**

<table>
<thead>
<tr>
<th>3D Printing</th>
<th>Cost averages for equivalent functionality</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>$40,000</td>
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<tr>
<td>2014</td>
<td>$100</td>
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</tbody>
</table>

Source: Accenture analysis based on research in Exponential Organization by Salim Ismail

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Source: Bloomberg, Accenture analysis

![Analysis of logistics industry revenues (CAGR, %, 2008-2018e)](image-url)
Future horizons: digital themes and initiatives

Calculating the value of digital transformation in the logistics industry.

Drawing on these industry and technology trends, we have identified five digital themes that we believe will be central to the digital transformation of the logistics industry over the next decade.

Within each theme, we have identified digital initiatives that can be pursued by logistics players, highlighting case studies that illustrate the relevance of these initiatives to the industry.

These digital themes and initiatives provide a framework for us to calculate the potential value that digital transformation in the logistics industry could deliver over the next decade – both for the industry itself and wider society.

Delivering value through digital transformation for the logistics industry and society

How we calculated the value of digital transformation

Our value-at-stake methodology aims to assess the impact of digital transformation initiatives on industry, customers, society and the environment. It provides value estimates of global industry operating profits that are at stake from 2016 to 2025, and the contribution that digital transformation can make to customers, society and environment in that time frame.

Value at stake for industry comprises two elements. First, the potential impact on an industry’s operating profits that will be generated from digital initiatives (value addition). Secondly, operating profits that will shift between different industry players (value migration). Value-at-stake for society measures the value impact of digital transformation for customers, society and the environment.

For a full explanation of our value-at-stake methodology, visit digital.weforum.org.

Note: (1) We have followed a logarithmic scale for the value for Industry and Society, with industry value represented by cumulative operating profit from 2016-2025.

(2) Total Societal Value at Stake includes impact on the consumers, society and environment.

(3) Bubble Size indicates the combined business and societal annual impact on 2025. Where numbers have been shown, this is the total value at stake for industry and society cumulative to 2025. Shared Warehouse Capacity, Same-Day Delivery and 3D printing have not been represented.

Sources: World Economic Forum, Accenture Analysis
1. Information Services

Data-driven logistics businesses can optimize operations, reduce emissions and cut costs.

This theme focuses on the flow of data through the logistics value chain. Data today is an untapped yet immensely valuable resource. Analysed properly, data can coalesce into a source of insights for further action. Companies should understand data sources not as cost centres, but as future profit centres.

Information services: digital initiatives

- **Logistics control towers**

  The Internet of Things enables continuous automated monitoring of shipments, transportation assets, infrastructure, workers and customer requirements.

  Typically, a control tower has three levels: process execution, analytics, and visibility and data integration. Control towers can deliver unmatched levels of transparency throughout the value chain, helping to optimize logistics operations, reduce emissions and increase levels of customer satisfaction.

- **Analytics as a service**

  Demand forecasting, inventory optimization, maintenance analytics, predictive asset management and network flow analysis.

  Analytics will help logistics companies reduce operating costs, while having a major environmental impact. Network optimization can reduce the number of trucks on the road and increase last-mile delivery speeds – especially in cities – and thus lower emissions and waste production.

Unlocking value from information services

<table>
<thead>
<tr>
<th>Analytics as a service</th>
<th>Value at stake ($ billion, 2016-2025)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logistics Control Towers</td>
<td>Industry</td>
</tr>
<tr>
<td>604</td>
<td>206</td>
</tr>
<tr>
<td>208</td>
<td>51</td>
</tr>
</tbody>
</table>

Source: World Economic Forum / Accenture analysis

Case study: Weft (Analytics as a service)

Weft collects data at points along the delivery value chain via sensors attached to products or machinery. This data helps it track shipping containers around the world in real time, identify likely bottlenecks and shrinkage areas, and alert shippers to potential problems before they occur.

Source: startupprophet.com / angel.co
2. Logistics Services

New logistics concepts can boost global trade and give smaller businesses the chance to compete.

Three logistics services look set to have a lasting operational impact and demand as providers overhaul their infrastructure to stay competitive.

Logistics services: digital initiatives

- Digitally enhanced cross-border platforms
  Specialized small and medium enterprises (SMEs) can use these to break down the end-to-end process into different steps and, together, offer a service to compete with the big players.

- City logistics
  Intelligent traffic control systems, noise insulation, air pollution monitoring and underground routes all improve the well-being of inhabitants.

Carbon dioxide emissions are expected to decrease as freight consolidation efforts reduce vehicle miles driven in cities. Better coordinated urban operations will reduce vehicle numbers, benefitting all city users.

- Same-day delivery
  The fastest and most flexible solution for urgent and time-critical shipments.

Customers of an omnichannel retailer, such as a bricks-and-mortar grocery store with an online home delivery service, tend to want their goods as soon as possible – especially if they are perishables. However, same-day deliveries could have a negative environmental impact due to increases in air freight instead of road freight.

Note: City logistics not included in value at stake analysis

Source: Barclays, “The Last Mile: Exploring the online purchasing and delivery journey”. 2014

Case study: Oasis (City logistics)

To cope with increasing demand, this UK-based clothing retailer uses a split-order system that minimizes the impact of stock fluctuations on customers. Orders are usually fulfilled from a distribution centre but, if an item is out of stock there, Oasis has a Seek and Send service that can source the product from one of its stores and send it directly to the customer. If necessary, orders can be split, with some items sent from the distribution centre and others from stores. Customers are offered standard, next-day and nominated delivery. Within those time frames, they can choose hourly slots throughout the week or a 90-minute delivery service in selected cities throughout the United Kingdom.

Source: World Economic Forum / Accenture analysis

[Value at stake chart]

Source: World Economic Forum / Accenture analysis
3. Delivery capabilities

Drones, driverless vehicles and 3D printing could revolutionize delivery methods.

Crowdsourcing, innovations in manufacturing (3D printing) and technology (drones, autonomous trucks) have widened the range of options for deliveries and opened up logistics markets to new players.

### Delivery capabilities: digital initiatives

- **Drones**
  - Able to deliver perishables on demand, drones could raise purchasing volumes for home deliverers, and thus revenues for logistics operators.
  - Although drones still have a number of regulatory hoops to fly through, they look set to mainly replace last-mile delivery vehicles such as vans. Shorter delivery times and increased purchasing flexibility would appeal to consumers, while the ditching of bigger vehicles would shrink operators’ carbon footprint.

- **Autonomous trucks**
  - Self-driving delivery vehicles can reduce accidents and emissions, while significantly boosting business bottom lines.
  - Moving in convoys, autonomous trucks avoid unnecessary overtaking and reduce fuel consumption by slipstreaming and optimizing speed changes. Drivers are freed up to concentrate on logistics and maintenance issues.

- **3D printing**
  - Additive-layer manufacturing (ALM) generates 5 to 10% waste material, instead of the 90 to 95% typical of traditional machining techniques.
  - The ability to print objects on location might reduce demand for shipments, but there is an opportunity for logistics providers to refashion themselves as printers, shippers and installers of 3D-printed objects.

- **Crowdsourcing**
  - The fastest and most flexible solution for urgent and time-critical This can reduce environmental footprints by helping industry players make more efficient use of available capacity and thus reduce total driven miles.
  - The largest impact of digitalization to the logistics industry is likely to come from crowdsourcing. By offering better rates, convenience and real-time tracking, crowdsourcing platforms could allow newer entities from outside the industry to grab a share of the market from existing players.

### Unlocking value from delivery capabilities

- **3D printing**
  - Value at stake ($ billion, 2016-2025)

- **Crowdsourcing**
  - Value at stake ($ billion, 2016-2025)

- **Drones**
  - Value at stake ($ billion, 2016-2025)

- **Autonomous trucks**
  - Value at stake ($ billion, 2016-2025)

Source: angel.co

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**Case study: Keychain Logistics (Crowdsourcing)**

Keychain Logistics is a software marketplace, covering medium- and long-range trucking services. It eliminates brokers – and their fees – by connecting companies shipping products directly to independent semi-truck owner-operators. In giving truckers an opportunity to deliver multiple orders in one journey and raise asset fill rates, Keychain anticipates a shift from large trucking fleets towards decentralized, flexible and smaller truck fleets that operate independently.
4. Circular economy

There is great potential for logistics firms to develop plays in return services, enabling items to be reused or recycled.

The idea underpinning the circular – or restorative – economy is that maximum value is extracted from resources while they are in use; then, at the end of a resource’s service life, its constituent products and materials are recovered and regenerated.

The practice could reap practical benefits in the logistics sector. Although the requirement for businesses to minimize the use of ‘new’ materials reduces the number of potential new logistics commissions, it increases demand for complex return processes.

Case study: Dell

Committed to closed-loop plastics recycling, Dell takes back customers’ old systems. With the launch of the OptiPlex 3030 All-in-One, Dell became the first in the industry to offer a computer made with third party-certified closed-loop recycled plastics. Dell implemented a major redesign across engineering, industrial design, procurement, logistics and marketing to embed the use of post-consumer recycled plastics in its products. Working in more than 78 countries to help consumers find better ways to extend the life of their technology, Dell is also looking to shape international standards and policies towards a circular economy.

Source: dell.com
5. Shared logistics capabilities

These initiatives can reduce operating costs by boosting utilization rates of warehouses and vehicles.

The sharing economy will benefit logistics as it allows all participants to share fixed costs, enabling companies to make several smaller investments rather than a single large investment. The main applications of shared logistics capabilities will be in sharing cost-intensive physical assets, notably warehouses and freight-transporting vehicles.

**Shared logistics capabilities: digital initiatives**

- **Shared transport capacity**
  
  A crucial strategy for reducing emissions and mitigating the transport sector’s impact on climate change.

  Firms can split vehicle capacity simultaneously (for instance, by ride-sharing) or over time (for example, by truck-sharing). Both ride-sharing and truck-sharing allow the cost of the journey to be divided. Apart from improving last-mile delivery services – as shipments can be brought forward with shorter waiting times to fill up a vehicle shared by several companies – shared transport could also bring significant environmental benefits.

- **Shared warehouse capacity**
  
  Allows firms to benefit from cost synergies and greater flexibility.

  Warehousing and IT costs can be shared across the customer base at a particular warehouse. This mitigates the risk of having a large fixed cost base, making cost per unit easier to control. Sharing warehouse space could allow companies to carry out order and distribution consolidation in several locations, rather than just one, providing a better cost-to-serve ratio and reducing road miles due to improved drop densities.

### Unlocking value from shared logistics capabilities

<table>
<thead>
<tr>
<th>Shared warehouse capacity</th>
<th>Shared transport capacity</th>
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<tbody>
<tr>
<td>37</td>
<td>52</td>
</tr>
<tr>
<td>542</td>
<td>34</td>
</tr>
</tbody>
</table>

Value at stake ($ billion, 2016-2025)

- Industry
- Society

Source: World Economic Forum / Accenture analysis

**Case study: Coyote (Shared transport capacity)**

Coyote matches demand for client shipments with available carriers. The system specializes in scheduling shipments to travel on carriers’ return trips (backhaul). Currently, trucks travel empty on up to half of all return trips, so there is huge potential to improve efficiency. Coyote says that in 2014, it eliminated 31 million ‘empty’ miles and avoided 56,300 tons of CO$_2$ emissions.

Source: coyote.com
Options for success in a digital logistics industry

A series of short-term and long-term recommendations to help enterprises thrive in a digital logistics industry.

We have drawn up a number of concrete investments in digital capabilities that will form the building blocks of a successful digital logistics business. We have divided these between shorter-term ‘no-regret’ capabilities, which a logistics firm needs to remain competitive, and bold plays, which are longer-term investments that may revolutionize a company’s strategy.

**No-regrets capabilities**

- **Collect operational performance data along the entire value chain**
  Data needs to be consistent and holistic. Master data management is crucial as all data must be linked to the right source.

- **Build or buy analytical capabilities to derive information from big data sources**
  This helps identify correlations between several data points, enabling operational efficiency gains to be pinpointed across the value chain. Identifying, recruiting and retaining analytics talent becomes an important part of HR strategy.

- **Embrace shared transport**
  Shared transport platforms will allow logistics companies to improve margins by increasing utilization rates and reducing empty backhauls.

**Bold plays**

- **Focus on new delivery concepts**
  Autonomous trucks, drones and 3D printing have the potential to reduce operating costs – watch their development closely to spot the right time to invest and stay competitive.

- **Have a strategy in place for emerging logistics concepts**
  As consumer demand changes, enterprises may need strategies for areas such as city logistics and same-day delivery.

For our full recommendations, please read our in-depth report on digital transformation in the logistics industry, available at digital.weforum.org.

To find out more about the DTI project, visit reports.weforum.org/digital-transformation.
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**References**
For a full list of sources and references, please refer to our in-depth report on the logistics industry, available at digital.weforum.org.