



The Future of Transportation & Logistics

Trends & Developments
in the Greek Market

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Survey objectives

What are we setting out to accomplish?



Demand Analysis

This part explores the evolution of the 3PL sector size and growth in the Greek market. It examines the financial trends by analysing specific financial metrics and identifies the different types of services offered. Furthermore, the Covid -19 impact on 3PL services is explored.



Supply Analysis

This section focuses on Greek 3PL market concentration and the key players operating in the local logistics market. There is a comparative analysis through an evaluation of their size, their market shares and historical growth directions, by comparing their financial performance to gain insights into their respective positioning.



Trends, Challenges & Developments

This section analyses the latest trends in the logistics industry, with a specific focus on 3PL activity. Starting from the Covid-19 impact on a global scale, key global players are identified, main global trends are highlighted and specific focus is given on sustainability.



Case Study

This section is dedicated to the current challenges of fulfillment centers in the Greek market and the way these challenges are being addressed by a gradual automation solution. It explores the main elements of the automated system, the financial insights and the benefits of the solution.

Survey objectives

1. Demand



3PL Sector Size & Growth

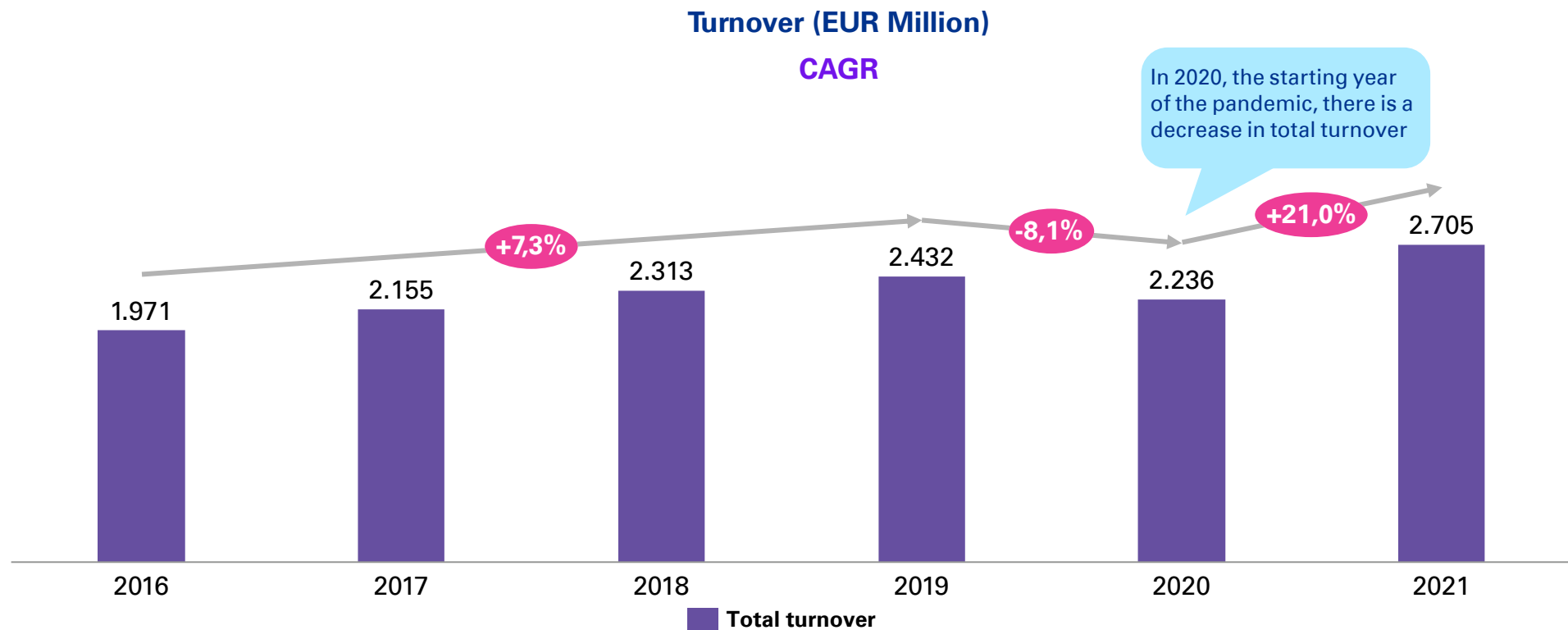
Revenue evolution

The 3PL industry is exhibiting growth year on year, over the 6 year period

The persistent influx of major foreign multinational corporations in the Greek market, along with the growing storage needs of numerous local organizations and the need for efficient handling and distribution of products, is generating a robust need for transportation services and storage space.

Overall, the evolution of market size over a 6-year period is showcasing a growth.

A smooth upward trend is depicted between years 2016 to 2019 with a compounded annual growth of 7.3%. The following period there is a downward trend of -8.1% as it is illustrated below and in 2021 a sharp increase of 21% shows the sector's upswing especially for the companies with high turnover.



Considerations for analysis:

- The analysis refers to companies operating in Logistics sector and own assets and/or infrastructure including warehouses, trucks etc. and are responsible for the physical movement of goods along the supply chain
- Some may specialize in specific areas such as dry box, cold storage, drugs etc.

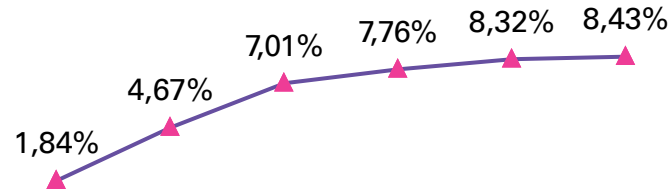
Figures based on public financial statements provided by ICAP & KPMG analysis

Financial Trends

For 3PL companies having revenue above EUR 1 million in 2021

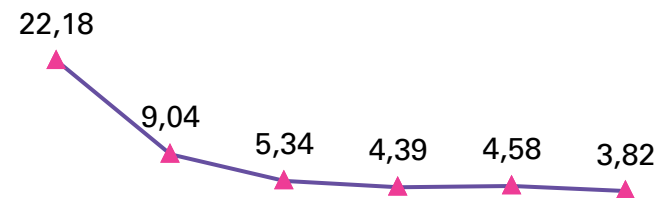
EBITDA Margin

CAGR 2016-2021: 35.6%



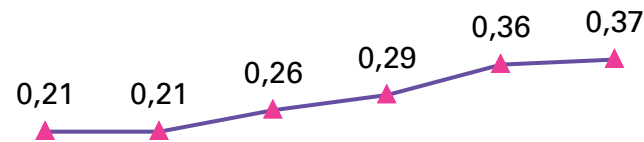
Net Debt / EBITDA

CAGR: -29.7%



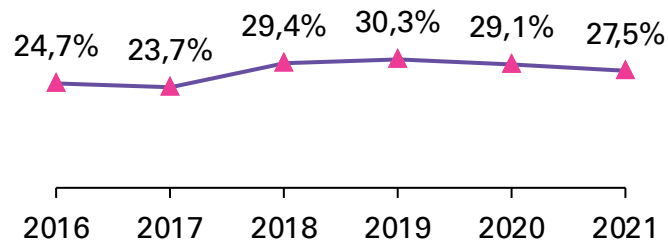
Liquidity

CAGR: 12%



Gross Profit Margin

CAGR: 2.2%



Financial Trends

The complexity of developing in-house fleets and owning warehouses in combination with the rise of e-commerce have driven the growth of the 3PL sector, which is depicted in the following financial metrics:

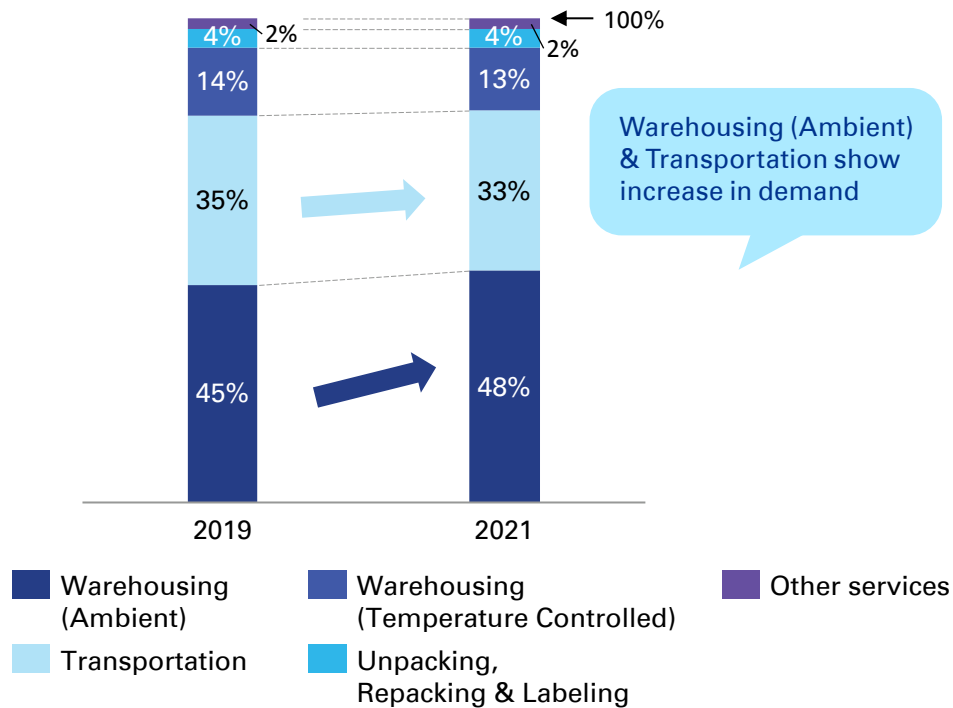
- By looking at the EBITDA Margin trend there is a stable annual growth over the 6 years. This indicates an increasing efficiency in logistics and transport facilities.
- The decreasing trend of Net Debt / EBITDA highlights a trend of industry recovery and a steadily increasing ability to repay debt.
- Although the liquidity ratio is low, there is a positive trend over the 6 years.
- Gross Profit margin remains generally stable over time, although, it seems that margins are negatively affected in the last 3 years, especially after 2019 due to Covid-19 impact.

Figures based on public financial statements provided by ICAP & KPMG analysis

Overview of Services

Types of Services and 3PL market revenue by sector

Types of Services

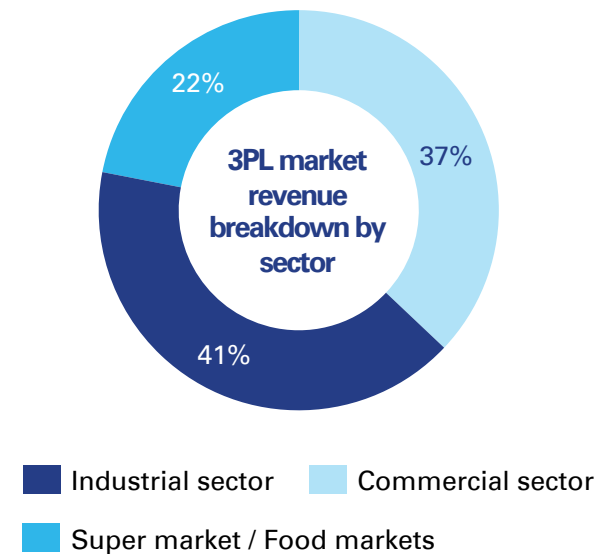


Warehousing (ambient & temperature controlled) and transportation services corresponded to 94% of the total value of 3PL services in 2021.

The remaining 6% of the total value, incorporates Unpacking, Repacking & Labeling, monitoring, traceability and software management.

Over the 3 year period (2019-2021), Warehousing, especially Ambient and Transportation Services showcase increase in demand.

3PL market revenue by sector served



41% of the total market value, in 2021, originated from the Industrial sector - businesses operating in Petroleum and energy, Cement and Construction, Metal Processing & Manufacturing, Engineering and Construction etc.

59% of the total market value, in 2021, originated from the Supermarkets and Commercial sector. Over half of the total revenue is supported by super markets and commercial businesses across the Greek market.

Figures based on public financial statements provided by ICAP & KPMG analysis

Covid-19 impact

The main effects on the T&L sector in Greece

During the Covid-19 pandemic, the 3PL sector was one of the sectors that was majorly impacted, as not only the **needs for transportation increased (increase in e-commerce)** but also major restrictions came into place. Companies were forced to find ways to serve the increased needs and become more efficient by adopting new **advanced technologies**.

01



Increased demand for last-mile delivery services

- The Greek logistics and transportation sector was projected to grow by 5.5% in 2021, according to the National Bank of Greece during the pandemic.
- Businesses focused on developing their e-commerce activity, especially in the food industry as consumers opted to buy online more right after the beginning of the pandemic.
- Businesses initiated the implementation of proactive inventory strategies to avoid obsolete goods and absorb increased demand in the future.

02



Disruptions in supply chain & delays

- The Covid-19 pandemic caused a big disruption in supply chain and as a result accelerated the adoption of digital technologies in the Greek logistics and transport sector, with an increasing number of companies investing in automation, artificial intelligence, and big data analytics. Businesses were forced to revise their supply chain strategies to cope with the challenges posed by the pandemic.
- Strategic locations for warehousing and distribution centres got under the scope of many businesses.
- In 2020, €150 million were spent in logistics related facility/operations upgrades.

03



Intensified border & import restrictions

- Many businesses that had their production and sourcing activities dependent on other countries, faced multiple implications due to the global logistics crisis.
- A National Plan for Transport, Infrastructure and Networks was developed by Government, which aimed to improve the country's logistics infrastructure and address issues such as road congestion and port inefficiencies.

04



Advanced automation systems put in the spotlight

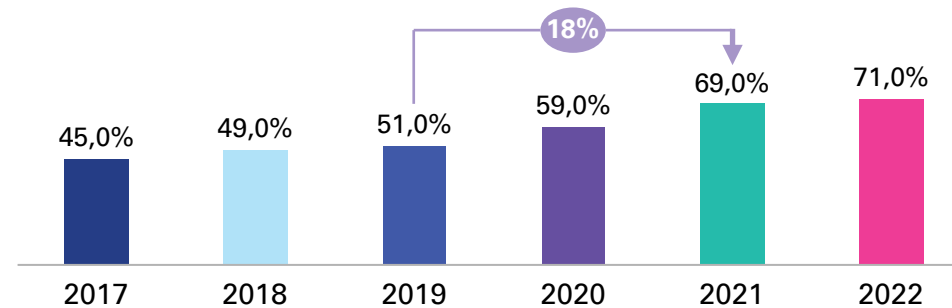
- As the pandemic forced social distancing and put pressure on operational effectiveness, businesses were forced not only to reduce staff but also continue their business under challenging situations.
- Many businesses took the strategic decision to implement new automation techniques especially in warehousing by installing robotics technology systems.

Covid-19 impact

The increase of e-commerce and the readiness of Greek T&L companies

Covid-19 put the preparedness of the 3PL sector in Greece into the test. Greek 3PL companies were called to cover **the increased needs for transportation** deriving from the increase in e-commerce but also had to demonstrate **operational effectiveness** and **strength to overcome their overall unpreparedness**.

Percentage of internet users that bought goods or services online



E-commerce activity increased majorly during the pandemic, increasing the needs for transportation services, either for imports or for last mile deliveries

Performance index was lower than other countries

Logistics Performance Index (LPI):

Measures performance along the logistics supply chain within Greece (2018)

42nd out of 160 countries
With a score of **3.20 / 5.00**

The Greek **LPI overall score in 2018** was approx. **1.00 grade behind Europe's leader, Germany (4.20)**. This index reflects perceptions of a country's logistics performance based on several criteria such as the efficiency of the **customs clearance process**, **quality** of trade -and transport- related **infrastructure**, ease of arranging competitively priced international shipments, quality of **logistics services**, ability to **track and trace** consignments, and frequency with which shipments reach the consignee within the **scheduled time**. The index ranges from 1 to 5, with a higher score representing better performance.

Level of preparedness was low

UNCTAD B2C E-Commerce Index ranking:

Measures an Greece's preparedness to support online shopping (2019)

41st out of 152 countries

Overall, Greek 3PL companies were **not properly prepared to face such an increase in demand in ecommerce**, but managed to recover promptly, as in 2020 Greece's position improved by ranking 33rd in the UNCTAD Index.

Sector Overview

Warehousing & Transportation key takeaways



Sector growth

The 3PL sector remains competitive in Greek market, with an average of 6.5% CAGR in revenue from 2016 to 2021. Regarding the size of the companies there is only little room for those who aggressively focus on net sales as there is excess number of companies well established in the market.



Financial Trends

Financial indicators show that there are increasingly efficient logistics and transport facilities., with relatively stable GP margins a steadily increasing ability to repay debts.



3PL Services & Sector contribution

In 2021, approximately 94% of the total value of 3PL services corresponded to warehousing and distribution services. Also, Super markets & Commercial businesses accounted for over the half of the total market value.



Covid-19 impact to the Greek 3PL sector

The Covid-19 pandemic had a significant impact on the 3PL industry. The spike in demand for transportation services caught many 3PL companies off guard and highlighted the need for increase in operational effectiveness.



Increase in e-commerce and sector's preparedness

The transportation needs spiked during the pandemic, deriving from the increase in e-commerce. The Greek sector 's performance was ranked lower than other countries and showcased a high level of unpreparedness.

2. Supply

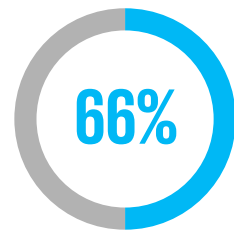


3PL Providers

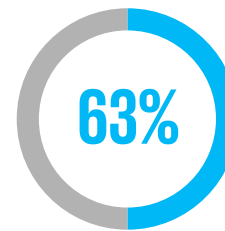
Size of 3PL companies

The Greek 3PL market mainly consists of small and medium-sized enterprises

According to 2021 turnover figures*, more than half of the companies (63%) had a revenue of up to EUR 1 million. The graph below segments 3PL companies into 6 groups according to their 2021 turnover, proving that the market consists of mainly SMEs.



Percentage of companies having less than EUR 1 million revenue in 2019

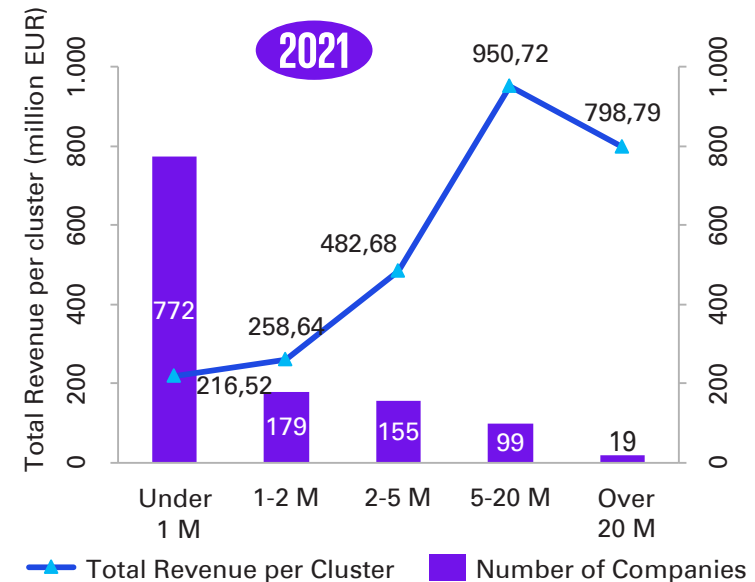
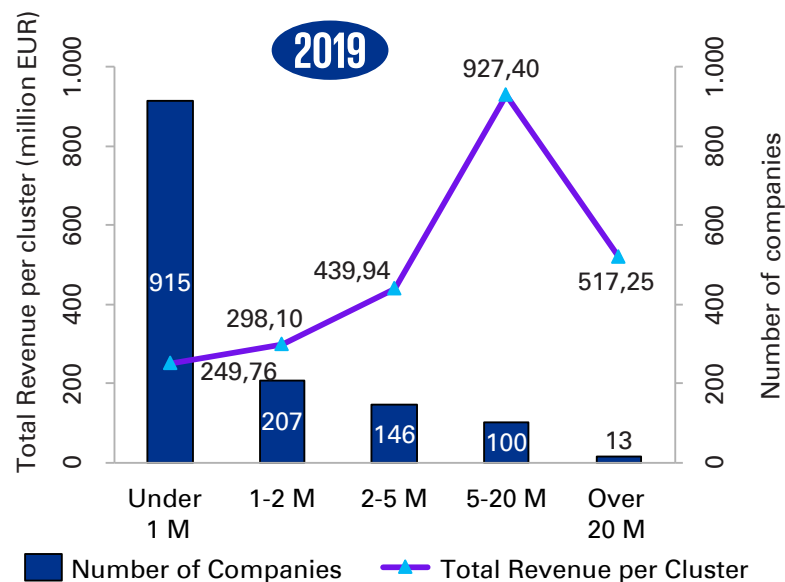


Percentage of companies having less than EUR 1 million revenue in 2021



Total Revenue per cluster combined by the number of companies achieving that revenue

*Clusters: Companies within each cluster have individual revenue between i.e. EUR 1-2 million



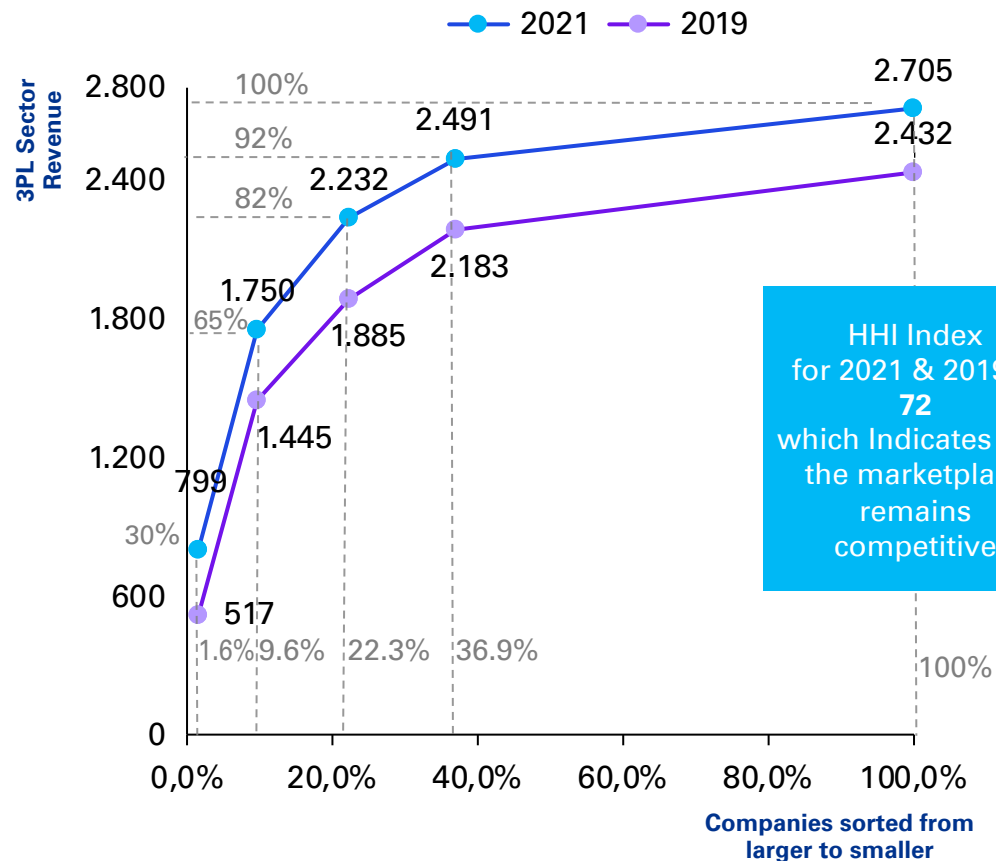
Figures based on public financial statements provided by ICAP & KPMG analysis

3PL Providers

Market concentration

The Greek 3PL market remains competitive with no significant changes

Cumulative Revenue vs Percentage of companies between Years 2019 and 2021



Market Concentration in 2021

- 3PL providers reporting revenue above EUR 20 million account for 1.6% of the total 3PL providers; they represent 30% of the total market value.
- 3PL providers reporting revenue above EUR 5 million account for 9.6% of the total 3PL providers; they represent 65% of the total market value.
- 3PL providers reporting revenue above EUR 2 million account for 22.3% of the total 3PL providers; they represent 82% of the total market value.
- 3PL providers reporting revenue above EUR 1 million account for 36.9% of the total 3PL providers; they represent 92% of the total market value.

Figures based on public financial statements provided by ICAP & KPMG analysis

3PL Providers

Current 3PL key players – Top 15 in terms of turnover

452 Companies exhibit above
EUR 1 million turnover in 2021

EUR 2,490 million

Turnover in 2021



Top 15 Companies account for:

EUR 706.7 million

(26.1% over the total)

	Market Share 2019 (%)		Market Share 2020 (%)		Market Share 2021 (%)	
	Turnover 2019 (€ mil.)	2019 (%)	Turnover 2020 (€ mil.)	2020 (%)	Turnover 2021 (€ mil.)	2021 (%)
BEINOGLUO ORPHEE S.A.	74,9	3.1%	71,4	3.2%	86,3	3.2%
DSV HELLAS S.A.	44,5	1.8%	56,1	2.5%	69,1	2.6%
FOODLINK S.A.	44,9	1.8%	64,6	2.9%	65,7	2.4%
SEAGULL S.A.	43,4	1.8%	37,7	1.7%	63,1	2.3%
GOLDAIR CARGO S.A.	49,3	2.0%	45,4	2.0%	55,5	2.0%
CARGO BOOK S.A.	19,3	0.8%	29,9	1.3%	53,1	2.0%
MAKIOS LOGISTICS S.A.	39,9	1.6%	38,9	1.7%	42,9	1.6%
DIAKINISIS S.A.	36,2	1.5%	38,8	1.7%	42,6	1.6%
MED FRIGO S.A.	27,9	1.1%	33,3	1.5%	40,6	1.5%
KUEHNE + NAGEL A.E.	36,7	1.5%	33,1	1.5%	38,1	1.4%
LIODAKIS BROS LTD	31,6	1.3%	31,1	1.4%	36,2	1.3%
GOLDEN CARGO S.A.	13,0	0.5%	24,0	1.1%	34,9	1.3%
DHL S.A.	31,6	1.3%	26,9	1.2%	29,2	1.1%
SARMED LOGISTICS	31,6	1.3%	21,8	1.0%	24,9	0.9%
SCHENKER S.A.	24,7	1.0%	20,5	0.9%	24,6	0.9%

Figures based on public financial statements provided by ICAP & KPMG analysis

3PL Providers

Current 3PL key players - Comparative Analysis

- The leading market players' revenue analysis reveals an upward trend in Net sales. However, the range of this increase varies depending on the strategy adopted by each company. Therefore, it is essential to understand each company's strategy path to gain a better understanding of their revenue growth. There is a trade off between aggressively gaining market share while sacrificing stable cash flow (Ebitda % shows a negative trend) and pursuing sustainable profitability.
- The decrease in Gross Profit Margin in the majority of companies depicts the increase of costs for the last 3 years and the intense competition as there is a big number of companies offering the same services in Greek market. Companies need to invest in new technologies to enhance their services, streamline their operations and stand out from their competitors.

Top 15 Companies	Net Sales 2021	Net sales growth 2019-2021	Ebitda % 2021	Ebitda % growth 2019-2021	Gross Profit Margin % 2021	Gross Profit Margin % growth 2019-2021
BEINOGLOU, ORPHEE S.A.	86,278,957 €	▲ 15.2%	9.1%	▲ 22.0%	15.6%	▲ 26.1%
DSV HELLAS S.A.	69,108,304 €	▲ 55.4%	3.8%	▲ 36.6%	11.8%	▼ -6.1%
FOODLINK S.A.	65,689,585 €	▲ 46.2%	6.9%	▼ -25.9%	5.7%	▼ -8.3%
SEAGULL S.A.	63,080,588 €	▲ 45.2%	2.3%	▲ 5.2%	19.1%	▲ 12.5%
GOLDAIR CARGO S.A.	55,470,686 €	▲ 12.5%	7.2%	▼ -40.7%	20.6%	▼ -14.0%
CARGO BOOK S.A.	53,107,666 €	▲ 175.5%	2.1%	▼ -57.0%	8.1%	▼ -56.1%
MAKIOS LOGISTICS S.A.	42,858,711 €	▲ 7.4%	12.4%	▼ -4.9%	10.4%	▼ -8.6%
DIAKINISIS S.A.	42,640,720 €	▲ 17.8%	18.0%	▼ -5.6%	7.5%	▲ 0.5%
MED FRIGO S.A.	40,591,593 €	▲ 45.5%	18.3%	▲ 19.6%	39.4%	▲ 29.6%
KUEHNE + NAGEL A.E.	38,136,925 €	▲ 4.0%	4.7%	▲ 8.2%	31.0%	▲ 4.9%
LIODAKIS LTD	36,200,718 €	▲ 14.5%	4.9%	▲ 15.9%	5.6%	▼ -22.2%
GOLDEN CARGO S.A.	34,899,193 €	▲ 168.1%	9.0%	▲ 70.2%	14.6%	▼ -2.7%
DHL S.A.	29,150,169 €	▼ -7.8%	3.8%	▼ -9.7%	8.8%	▲ 5.7%
SARMED LOGISTICS S.A.	24,894,322 €	▼ -21.2%	9.4%	▲ 65.5%	9.0%	▼ -54.3%
SCHENKER S.A.	24,633,092 €	▼ -0.3%	-5.4%	▲ 44.6%	20.4%	▲ 8.5%

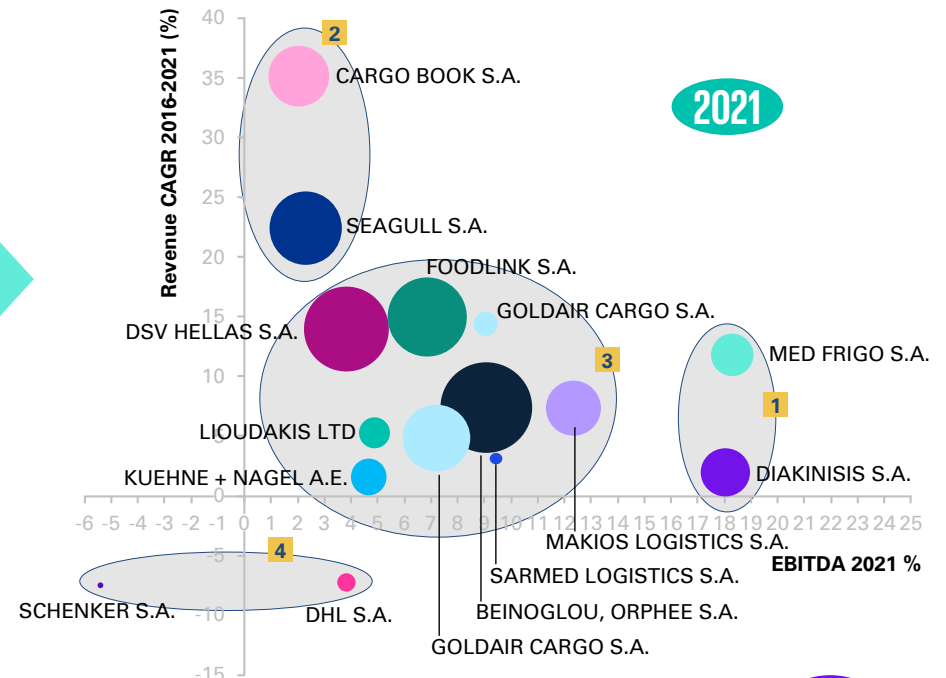
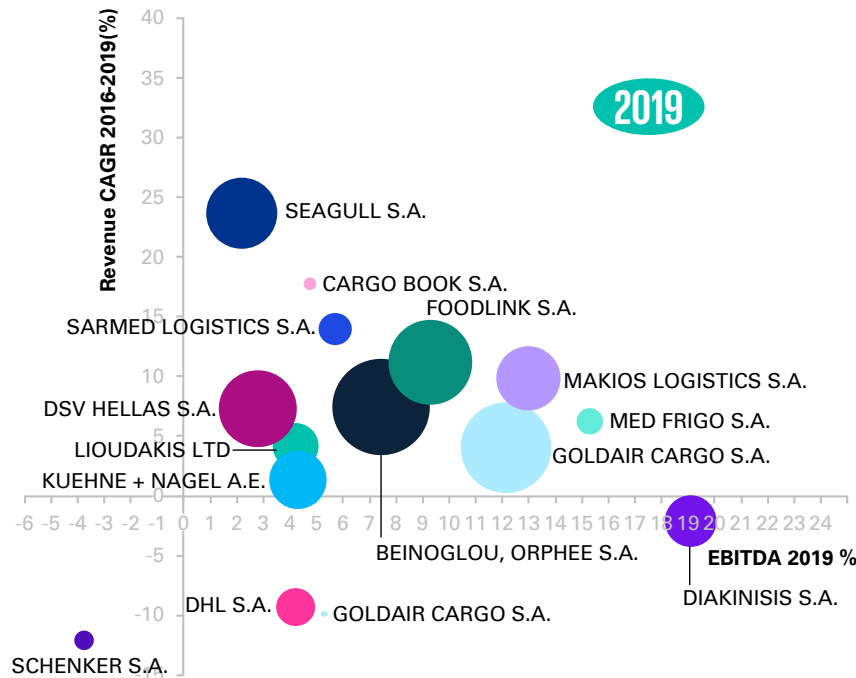


Turnover		EBITDA %		Gross Profit margin %	
Top 3	Bottom 3	Top 3	Bottom 3	Top 3	Bottom 3
BEINOGLOU, ORPHEE S.A.	DHL S.A.	MED FRIGO S.A.	SEAGULL S.A.	MED FRIGO S.A.	DIAKINISIS S.A.
DSV HELLAS S.A.	SARMED LOGISTICS S.A.	DIAKINISIS S.A.	CARGO BOOK S.A.	KUEHNE + NAGEL S.A.	FOODLINK S.A.
FOODLINK S.A.	SCHENKER S.A.	MAKIOS LOGISTICS S.A.	SCHENKER S.A.	GOLDAIR CARGO S.A.	LIODAKIS L.TD

Figures based on public financial statements provided by ICAP & KPMG analysis

3PL Providers

Current 3PL key players - Comparative Analysis



- 1 Profitability Champions:** Diakinisis and Med Frigo, achieved the highest EBITDA margin among the top 15 companies. Their performance is promising based on profitability metrics while their dynamic in growth related figures seem to be less competitive in the market.
- 2 Growth Champions:** Cargo Book and Seagull show over 20% of CAGR over the last 6 years. Cargo Book scaled rapidly over the last 3 years, however, EBITDA margin slightly dropped showing that the company is mainly focusing on expansion.
- 3 Balanced players:** Beinoglou Orphee, Foodlink, DSV, Goldair account for approx.10% of the total market. Their EBITDA margin indicates solid management whereas their growth ranges from low to average compared to competitors
- 4 Strugglers:** Schenker and DHL seem to struggle in this competition field.

Investments

- Since 2021, HIG capital entered logistics market and invested in MAKIOS logistics and Beinoglou Orphee
- Foodlink absorbed Delatolas which was also a significant investment move in the sector
- 49% of Seagull stake is bought by EOS Capital Partners investing in modern warehousing methods





Size of 3PL companies

The Greek 3PL market mainly consists of small and medium-sized enterprises. According to 2021 turnover figures, more than half of the companies (63%) had a revenue of up to EUR 1 million.



3PL Market Concentration

Market is fragmented despite the presence of many global logistics companies. Medium-sized and small companies have retained a significant market share. Only 452 companies out of the 1,245 generate revenue greater than EUR 1 million in 2021.



Top 15 companies in terms of turnover

The top 15 companies control 26.1% of the total market (EUR 706.7 million) allowing smaller players room for growth. The dominant sector is Transportation Services followed by Storage & Warehousing and then Transportation by land.



Comparative analysis

There is an upward trend in Net sales, with an EBITDA % showcasing a negative trend indicating the tradeoff between sustainable profitability and gaining market share. The decrease in Gross Profit Margin in the majority of companies depicts the increase of costs for the last 3 years and the intense competition.



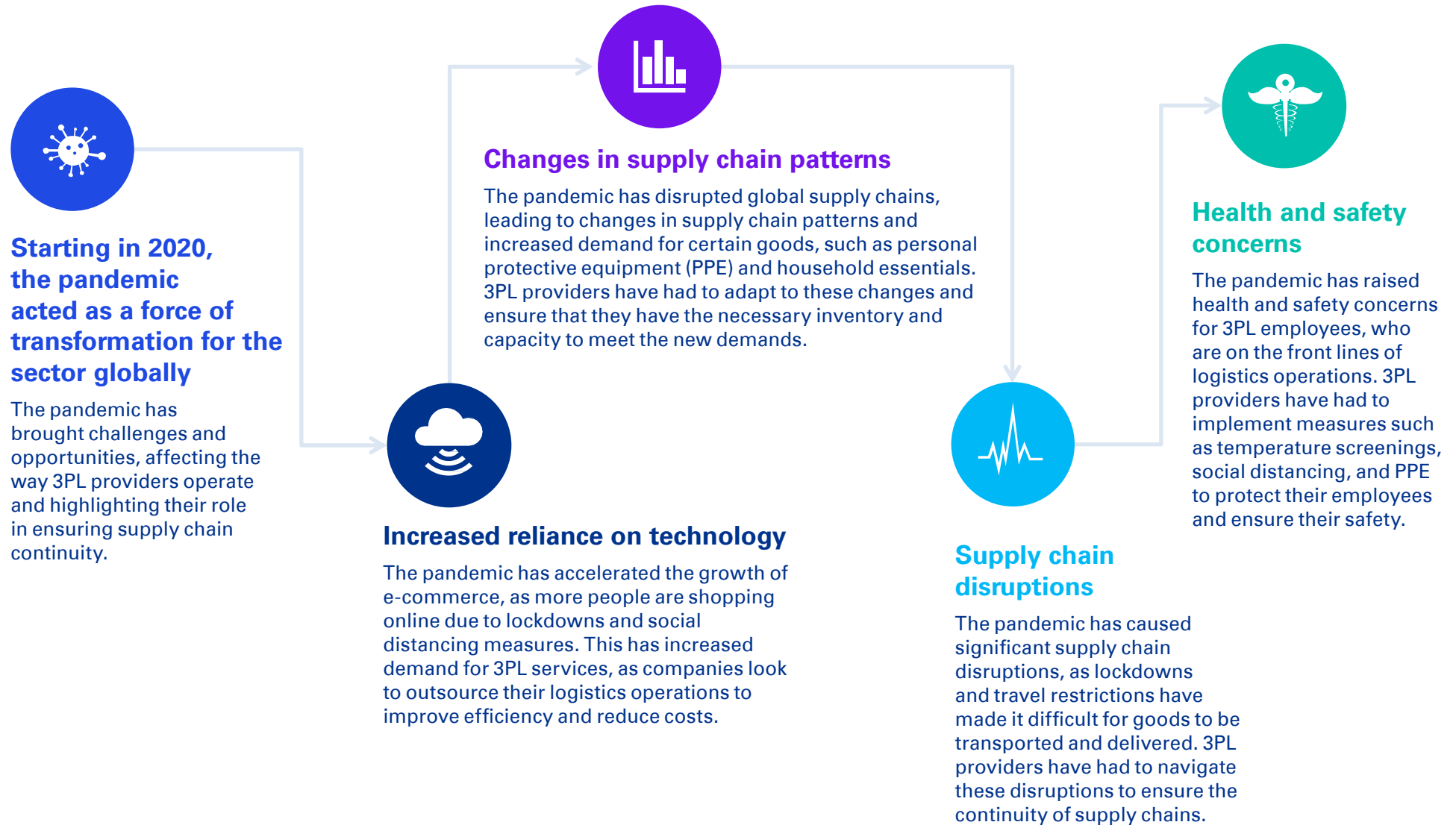
Key players comparison

Current 3PL players can be grouped into 4 categories based on selected criteria: Profitability Champions (Diakinisis, Med Frigo), Growth Champions (Cargo Book, Seagull), Moderately growing players (OB, Foodlink, DSV, Goldair etc.) and Strugglers (Schenker, DHL). Appetite for investments in the industry is growing, indicating sector growth.

3. Future of Logistics



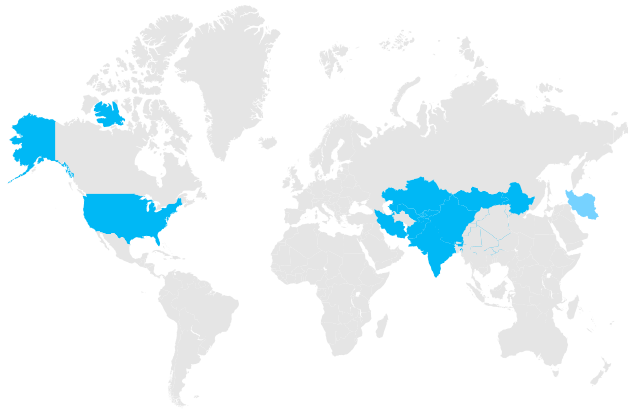
Covid-19 effect on the global 3PL industry as a transformation force



The global 3PL logistics industry has grown rapidly over the past few years as demands for transportation, warehousing, and many other services have expanded

USA and China contribute the most to the 3PL industry's revenue

The **United States** and **China** generated the largest revenues in the 3PL market by country comparisons, accounting for almost half of the global income. In 2021, the 3PL industry's total revenue in the United States had soared to approximately 348 billion USD.



Asia-Pacific continues to lead the Global 3PL Market

Asia-Pacific accounts for more than one-third of the world's 3PL market size, making it by far the largest regional market.

Most of the 3PL providers experienced **significant growth** in total revenue in 2021.

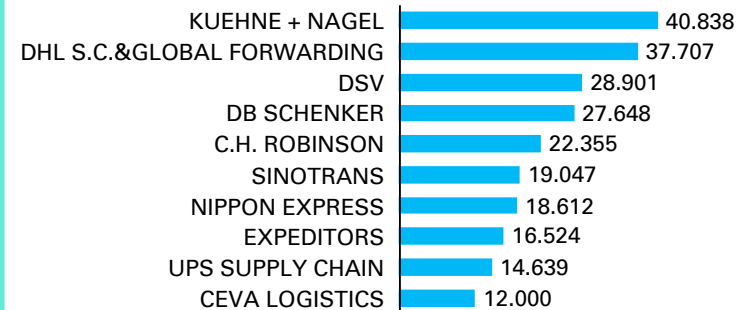
During the year, Kuehne + Nagel, DHL Supply Chain & Global Forwarding, DSV, and DB Schenker were some of the leading firms worldwide for 3PL services.

In the same year, C.H. Robinson, Expeditors, and UPS Supply Chain Solutions were the leading 3PL firms in the U.S.

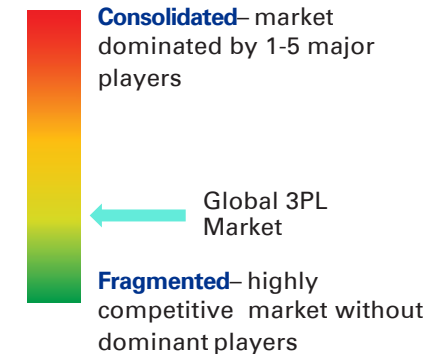
Fierce competition can easily undermine dominating firms' position in the market.

For instance, the Swiss company, Kuehne + Nagel faced fluctuating revenue generation between 2006 and 2017, mostly due to high competition. Since 2018, the company performs better and reached a peak revenue value of 36.7 billion Swiss francs in 2021.

Turnover 2021 (million USD)



Market Concentration



Focus on sustainability

53% of organizations plan to increase their focus on sustainable sourcing. Many 3PL companies are now focusing on sustainability and eco-friendly practices in their operations. This includes reducing waste, minimizing emissions, using renewable energy sources and adopting new technology systems that support sustainability.

Growth in e-commerce

The growth of e-commerce has increased demand for 3PL services, as more companies look to outsource their logistics operations to improve efficiency and reduce costs. 67% of organizations consider meeting customer expectations for speed of delivery as a critical force impacting the structure and flow of their supply chains over the next 12-18 months.

Customized solutions

3PL providers are offering more customized solutions to meet the specific needs of their customers, including tailored transportation, warehousing, and distribution services.



Increased adoption of technology

3PL providers are adopting technology such as automation, big data, and AI to improve their operations and offer better services to their customers. 6 in 10 plan to invest in digital technology to bolster their supply chain processes, data synthesis and analysis capabilities.

Expansion into new markets

3PL providers are expanding their operations into new markets, especially in emerging economies where the growth of e-commerce and retail industries is high.



Sustainability has become an increasingly important issue in recent years and the global 3PL industry is no exception. The 3PL industry plays a significant role in global supply chains and has a major impact on the environment, making it important for 3PL providers to adopt sustainable practices.

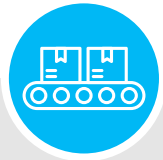
In what ways is sustainability affecting the global 3PL industry?



Increasing customer demand for sustainable logistics solutions

Companies are becoming more aware of their environmental impact and are looking for ways to reduce their carbon footprint.

As a result, there is increasing demand for 3PL providers that offer **sustainable logistics solutions**, such as **eco-friendly transportation options** and **energy-efficient warehouses**.



Increased focus on end-to-end sustainable supply chains

Companies are becoming more aware of the environmental impact of their end-to-end supply chains and are looking for ways to reduce their overall carbon footprint. 3PL providers are under pressure to adopt sustainable practices, starting from their selection of **suppliers & materials**, through their network of **warehouses**, transport means up until the **last mile** delivery.



Emphasis on emission reduction

Transportation is a major contributor to greenhouse gas emissions, and reducing these emissions is becoming increasingly important for companies looking to reduce their environmental impact. 3PL providers are under pressure to reduce emissions by adopting more eco-friendly transportation options, such as **electric vehicles** and **alternative fuels**.



Adoption of technologies that support the sustainability agenda

Technology plays a critical role in the 3PL industry, and many 3PL providers are investing in sustainable technologies, such as **automation and data analytics**, to improve efficiency and reduce waste. For example, some 3PL providers are using **predictive analytics** to optimize their transportation routes and reduce emissions.



Changes in government regulations

Governments around the world are introducing **regulations** to encourage companies to reduce their environmental impact. 3PL providers are under pressure to comply with these regulations and **adopt sustainable practices**, such as reducing emissions and using eco-friendly transportation options.

Key Takeaways

Future of Logistics



Global Trends

Focus on sustainability, growth in e-commerce, customised solutions, increased adoption of technology and continuous expansion into new markets are the main trends for the industry.



Global Leaders

DHL, Kuehne+Nagel, DB Schenker and DSV are leading the market with over 132 billion turnover in 2021.



Forces of Transformation

Covid-19 was a major force of transformation that led the companies to turn towards more sophisticated automation solutions to become more efficient.



Global Market

Asia-Pacific continues to lead the Global 3PL Market accounting for more than one-third of the world's 3PL market size.



Market Concentration

The market demonstrates fierce competition which can easily undermine dominating firms' position in the market.

A background image showing a group of business professionals in a meeting. A man in a grey suit is holding a tablet, and a woman in a blue blouse is writing in a notebook. There are other people and documents on a table in the foreground.

4. Case Study

**An incremental approach
to warehouse automation**

Case study

Businesses that run warehouse operations currently face many challenges which can be addressed through automation

A large part of the existing logistics facilities in Greece is rather **unsuitable to support modern market needs**. The majority of fulfilment centers are of **small size** with **outdated technical specifications and systems**.

Existing centers' challenges:


-  Operate at **maximum capacity**
-  Unable to serve the **increased demand**
-  Majority of areas are **congested**
-  **Delays** in processing orders and returns
-  Increase in **quality errors**

Increasing warehouse automation can follow a **greenfield approach** or a gradual introduction of **automation** in the existing warehouse

Greenfield approach

The relocation of all warehouse operations to a new automated warehouse



There are numerous obstacles to be addressed such as:

-  **Limited availability of large plots** for businesses to invest in new infrastructure.
-  Warehouse **relocation requires a significant investment** that the majority of businesses are not ready to step into.

Gradual introduction of automation

Introduce automation systems to existing warehouses in order to increase the capacity and take advantage of existing space.

This scenario also poses significant challenges:

-  **Causes disruption** to normal day-to-day warehouse tasks and affects warehouse's overall performance – making it nearly impossible to adopt.
-  Creates risks in terms of **human/automation interaction** and **flow of operations** between legacy and robotics systems.

The above challenges are a real barrier to increasing warehouse automation and competitiveness

Case study

Our Modular Warehouse Automation solution for existing warehouses



Modular Warehouse Automation (MWA)

A solution developed by KPMG to overcome identified obstacles and offer a viable scenario to automating existing warehouses using robotics technology.

In what ways is sustainability affecting the global 3PL industry?



Gradual transformation

Starting from a specific **part of the warehouse**, or a selected **process** that will be automated during the first stage of the project. For example, gradual automation can be implemented starting from the Returns process and gradually expand, **leading to a fully automated warehouse**.



No disruption

The solution safeguards current warehouse operations. The uninterrupted operation of the center during the transformation period is ensured, **without any interruption of daily tasks** compared to a traditional warehouse transformation solution.



Custom detailed design

The solution is custom designed to the needs of the client and takes into account several factors such as the characteristics of the center in terms of **spatial planning**, the **volumetric** characteristics of the SKUs handled and the **projected demand** over time.



Detailed operational plan

A detailed operational plan should be made on how **traditional systems** and **robotics** systems will **coexist** during the transitional period, with all that this entails in terms of **processes, software interconnection and safety**.



Detailed transformation plan

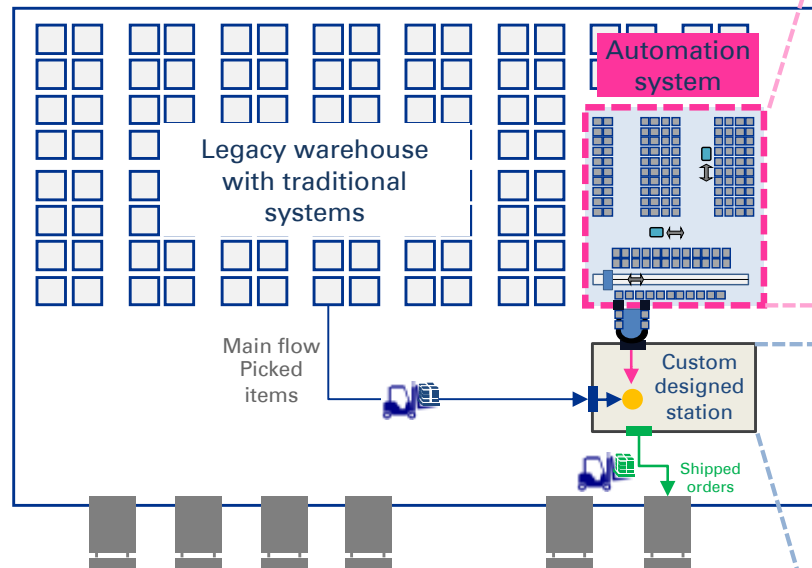
The solution should ensure its **scalability** and lead to full automation, which means that a **detailed timetable** will have to be built, including important milestones and progress planned.

Case study

Our Modular Warehouse Automation solution for existing warehouses

Starting from a **selected small space** in the warehouse, an automation system is **custom designed** to support the selected process (ie. process of returns, picking of specific SKUs etc.), the inventory needs as well as spatial requirements.

The solution is custom designed and can incorporate, indicatively, **roll racks** loaded with plastic totes that are moved by **AMRs**, a **mini-crane** and a small **conveyor** can serve as a picking buffer



AMRs & Roll racks



Roll racks are loaded with totes with partitions as storage means. Roll racks are moved by AMRs to a position where a mini-crane is operating.

Mini crane



A mini-crane picks the required tote and delivers it to a gate and back.

Conveyor belt



A conveyor belt holds the totes, where picker picks the respective lines and leads them inside the station.

Station's flow in



Pallets stored within the legacy part of the warehouse get transported to the station.

Custom station



Employees perform flow consolidation and order completion, with inventory originating from legacy and automation systems.

Station's flow out



Pallets with complete orders exit the station and are directed towards the respective loading bay.

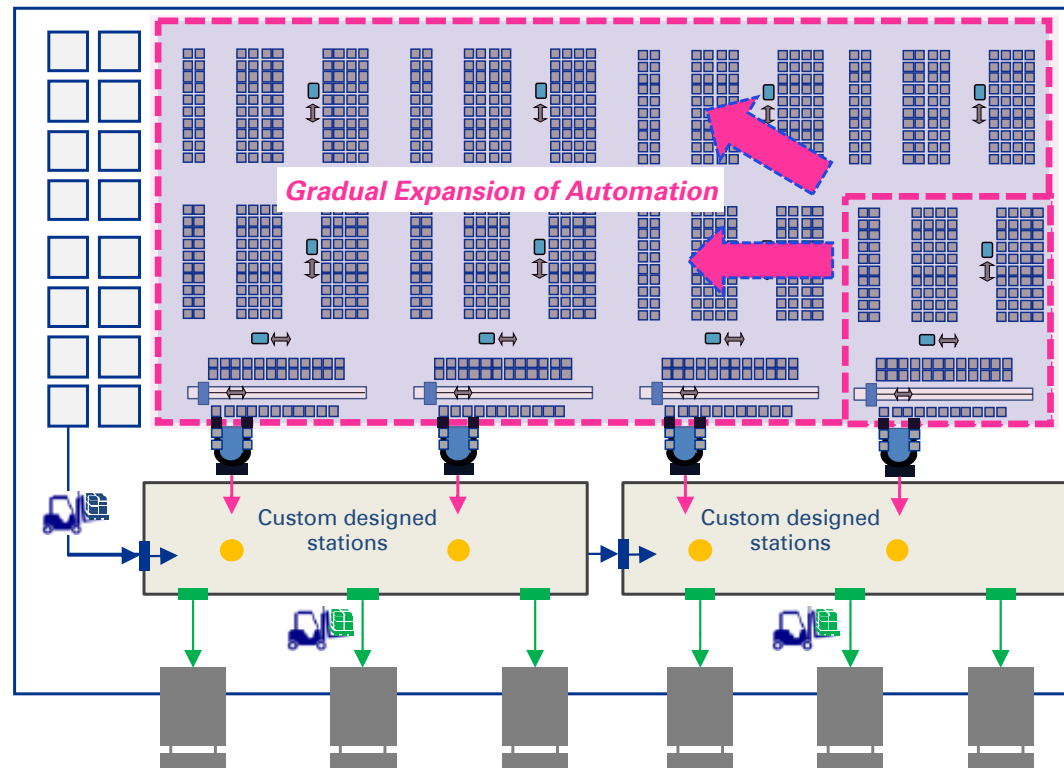
The automation system is designed to **coexist and cooperate** with the existing traditional systems of the warehouse through **software interfaces** and **custom designed picking/ replenishment stations** to merge picking and/ or replenishment flows.

Case study

Our Modular Warehouse Automation solution for existing warehouses

Starting from a specific part of the warehouse, the automation system is designed with the ability to gradually expand - leading to a fully **automated warehouse**.

In the end, the biggest part of the warehouse will be occupied by automation.

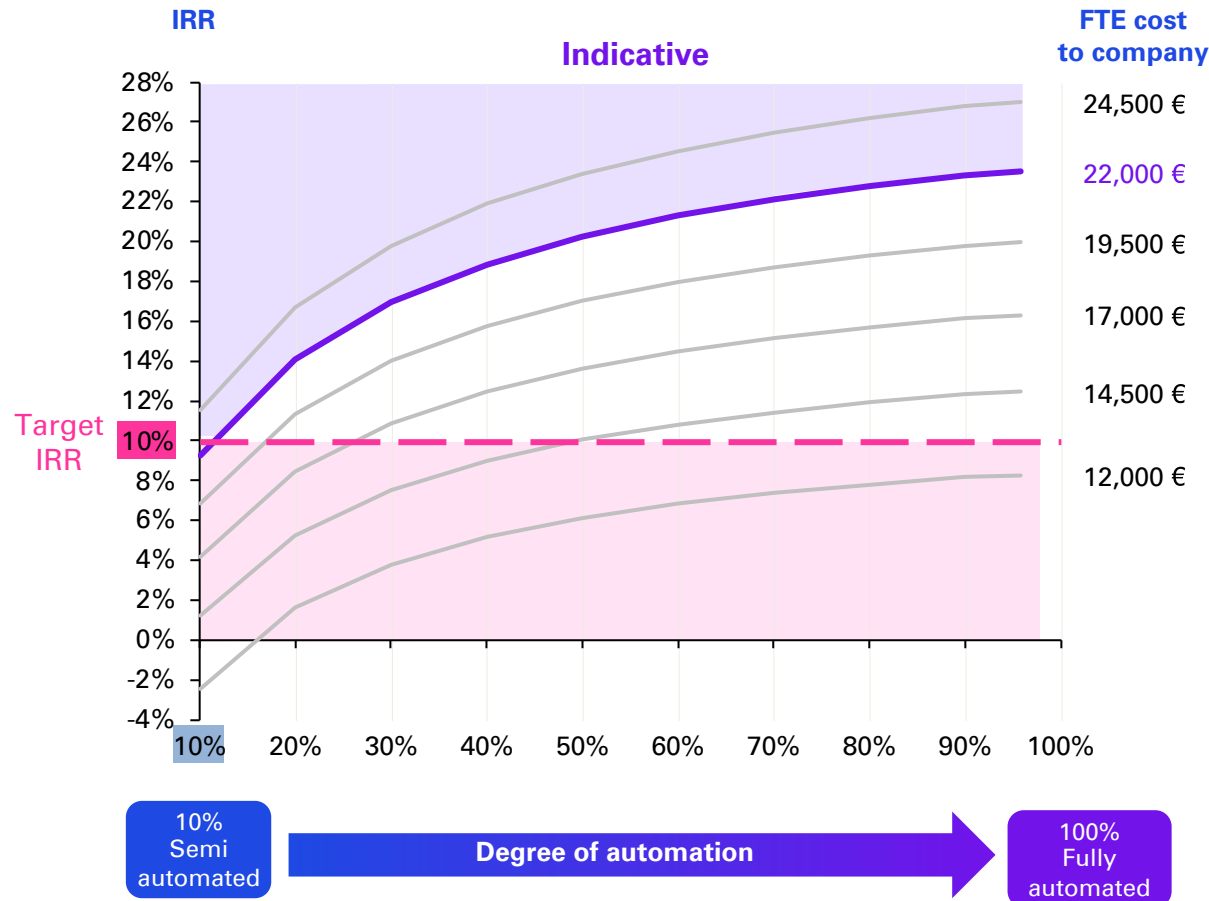


The **majority of operations** are served by **automation** with all the necessary **interfaces**.

A **small part of the warehouse** could still remain with **legacy systems** in case of inventory that has weight or dimensional constraints that cannot be served by automation.

Case study

Financial analysis indicates feasibility of the solution based on FTE costs



The FTE cost to company is one of the critical parameters that a company has to take into consideration.

- Indicatively, our analysis shows that, for a company with an **FTE cost of € 22.000** or above, investing even in a small degree of automation (10%) is a viable solution as a reasonable IRR is reached.
- Companies with lower FTE cost (e.g. around **€ 14.500**) will have to opt for a more extensive investment upfront (>50% degree of automation) in order to reach a good IRR.
- Such automation investments seem to not be viable only for very low average FTE costs (e.g. **€ 12.000** and below).

Case study

The benefits of the solution are significant

In conclusion, an approach of gradual warehouse transformation following a MWA solution seems to have considerable benefits:



Serves future projected growth

Automated systems are scalable and secure that any future volume increases will be addressed, reducing the risk of failure in operations. Traditional systems are not that flexible, scalable and require more human effort before they reach their capacity.



Supports ESG initiatives

This investment will help the client to take initiatives on issues related to the Environment, Society and Governance (ESG) with significant investment in digital systems and robotic applications to increase productivity, reduce operating costs and overall provide high quality services with sustainability as a key focus point.



Offers Improved employee experience

Automation will convert everyday employee tasks into less labour intensive work, as the total walking time will be reduced, stations will be ergonomically designed and physical intensive activities will be eliminated. Productivity will increase, giving room to focus more on quality and error elimination.

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