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The Travel And Mobility Tech Sector Attractiveness Report

Analyzing the investment activity of 60 travel and mobility corporations

Introduction: A Paradigm Shift

Times Have Changed

Previous editions of our annual "State of Travel and Mobility Tech" report series explored the venture capital (VC) landscape, identifying which travel and mobility sectors received the most VC funding and, consequently, held the greatest potential for innovation. This type of analysis was particularly revealing during the era of abundant, inexpensive capital that persisted until 2021.

However, with rising global interest rates, VC funding has significantly diminished. Does this reduction in VC funding imply that innovation within our industry has stalled? Not necessarily. While VC funds are becoming more cautious, the persistent industry challenges demand ongoing innovation.

Our New Approach To “Follow the Money”

Venture capitalists typically lack "skin in the game" regarding the specific industries or companies they invest in. Their focus is financial return, with little inherent drive to resolve industry-wide challenges.

However, entities deeply embedded within the Travel and Mobility Tech (TNMT) sector—such as airlines, hospitality providers, travel booking platforms, and mobility companies—do have such an interest. These corporations depend on continuous innovation to maintain and enhance their long-term viability.

Consequently, these established companies are investing in startups for more meaningful transformation than VCs. They do so through corporate venture capital, acquisitions, or forming joint ventures.

Corporate Investment Strategies

Examining the investment activities of major travel and mobility corporations provides deep insights into the strategic priorities and challenges faced by our sector and its various sub-sectors.

This year's research reveals distinct corporate investment strategies across different travel and mobility sub-verticals. Not only is there a variance in the annual investment volumes among industry leaders, but their strategic focuses also differ. For instance, hospitality providers typically invest with an eye towards sector growth, while aviation firms prioritize enhancing operational efficiency.

Sustainability investments also vary significantly by sector. Our study shows that the transportation sectors, particularly aviation and ground mobility, actively invest in sustainability and decarbonization—critical areas given their substantial environmental impacts and the increasing pressure from public opinion and regulatory mandates.

We also analyzed specific technology investments within the Travel and Mobility Tech corporate landscape. Are these investments in technologies like AI aligning with the broader tech industry's enthusiasm?

Our findings indicate a pragmatic approach: corporates are prioritizing practical applications that address longstanding industry challenges over merely chasing the latest tech hype.

What This Report Offers

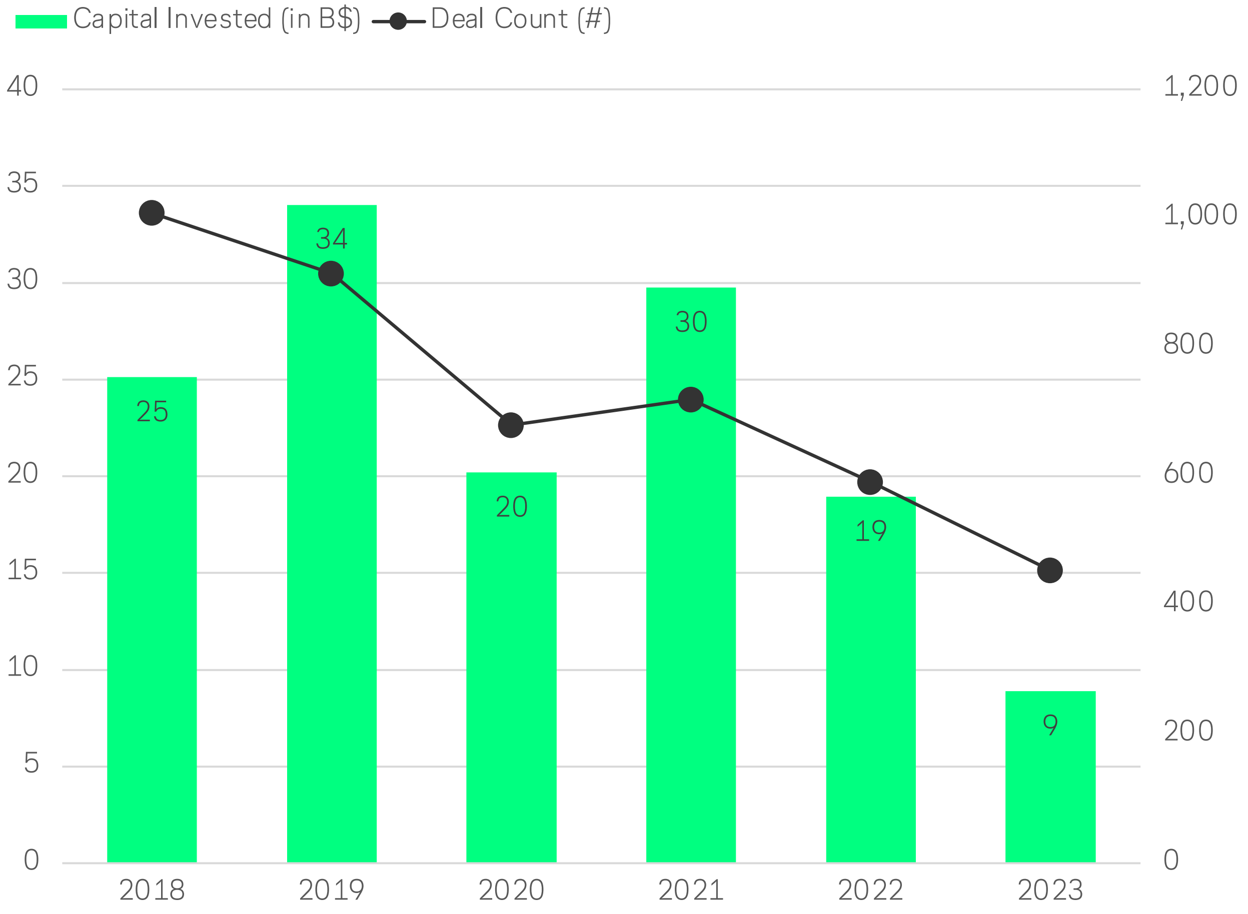
This report provides a clear overview of the major priorities and investment strategies of leading travel and mobility corporations from 2018 to 2023.

It details investment priorities specific to aviation, ground transport, hospitality, and online travel sectors, highlighting key investment areas and the startups that have secured funding in each domain.

For industry professionals, this report is essential for understanding shifts in innovation and preparing strategically for future industry developments.

The End of an Era: VC Funding into Travel and Mobility Tech Startups Has Declined Sharply

VENTURE CAPITAL FUNDING ACTIVITY IN TRAVEL AND MOBILITY TECH STARTUPS



Sources: Lufthansa Innovation Hub, TNMT.com, PitchBook Data Inc.

THE VC WINTER IN TRAVEL AND MOBILITY TECH

Previous editions of this report have closely examined the venture capital (VC) landscape and funding of startups within travel and mobility. However, VC investment is not only highly volatile and trend-driven but also heavily influenced by the prevailing financial and economic conditions. These conditions have shifted dramatically in recent years, fundamentally altering the VC landscape.

With the rising cost of capital, VC investment in Travel and Mobility Tech startups plummeted to less than $10 billion in 2023—less than one-third of the 2021 peak during the era of cheap money. The primary goal of VC firms is to generate returns, which has become more challenging with higher interest rates. Consequently, investors are now more cautious than ever.

What does this mean for our analysis? Our approach of following the VC money to understand innovation dynamics in the travel and mobility industry requires a new perspective. We have pivoted from tracking venture capital investments in emerging startups to focusing on investments made by the largest travel and mobility corporations, including airlines, mobility providers, hospitality groups, and major online booking platforms.

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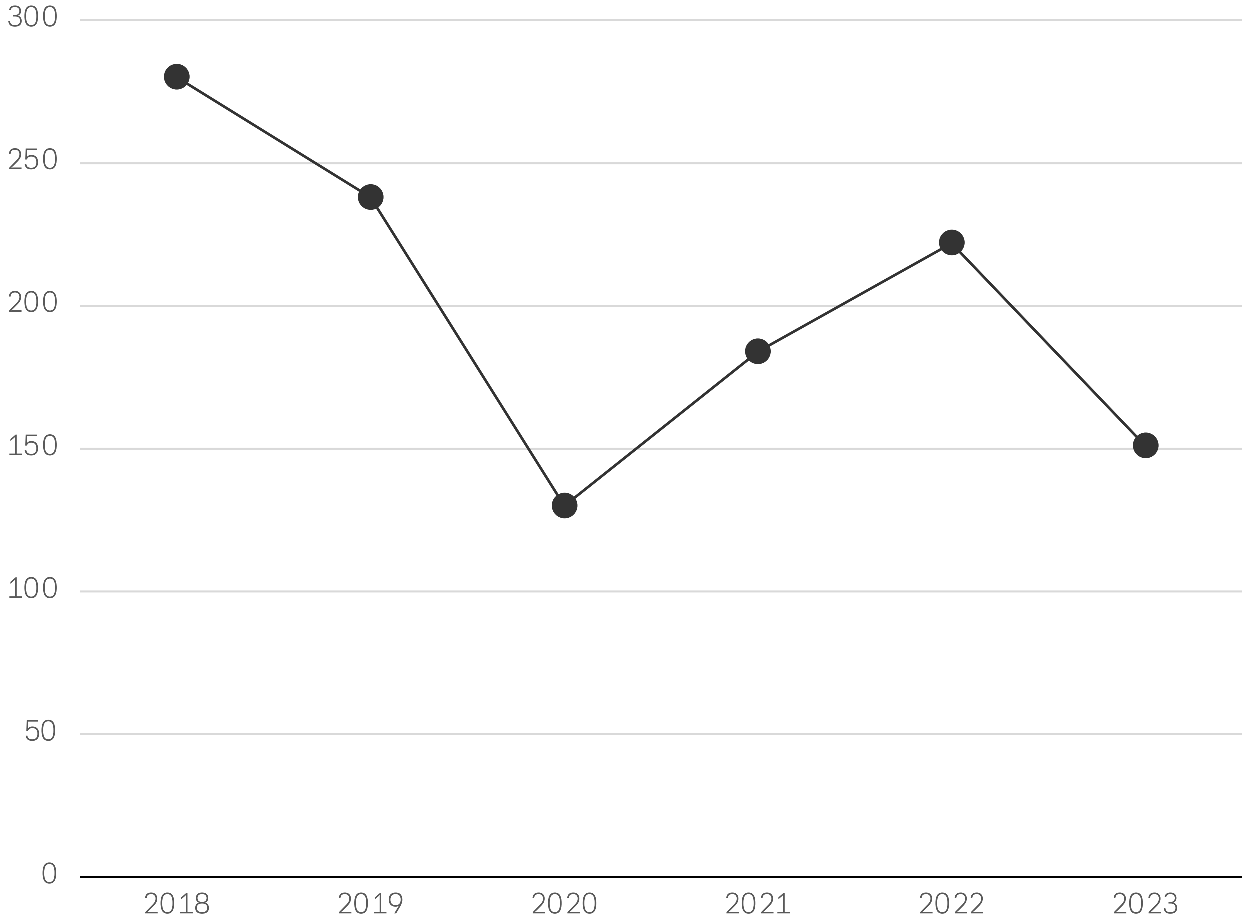
A new approach is needed

Tracking strategic investments by leading travel and mobility corporations provides crucial insights into current industry innovation priorities.

Stability Despite Change: Travel and Mobility Corporations Keep Investment Activity Up

INVESTMENT ACTIVITY (# OF DEALS) BY TRAVEL AND MOBILITY CORPORATIONS



Sources: Lufthansa Innovation Hub, TNMT.com, PitchBook Data Inc.

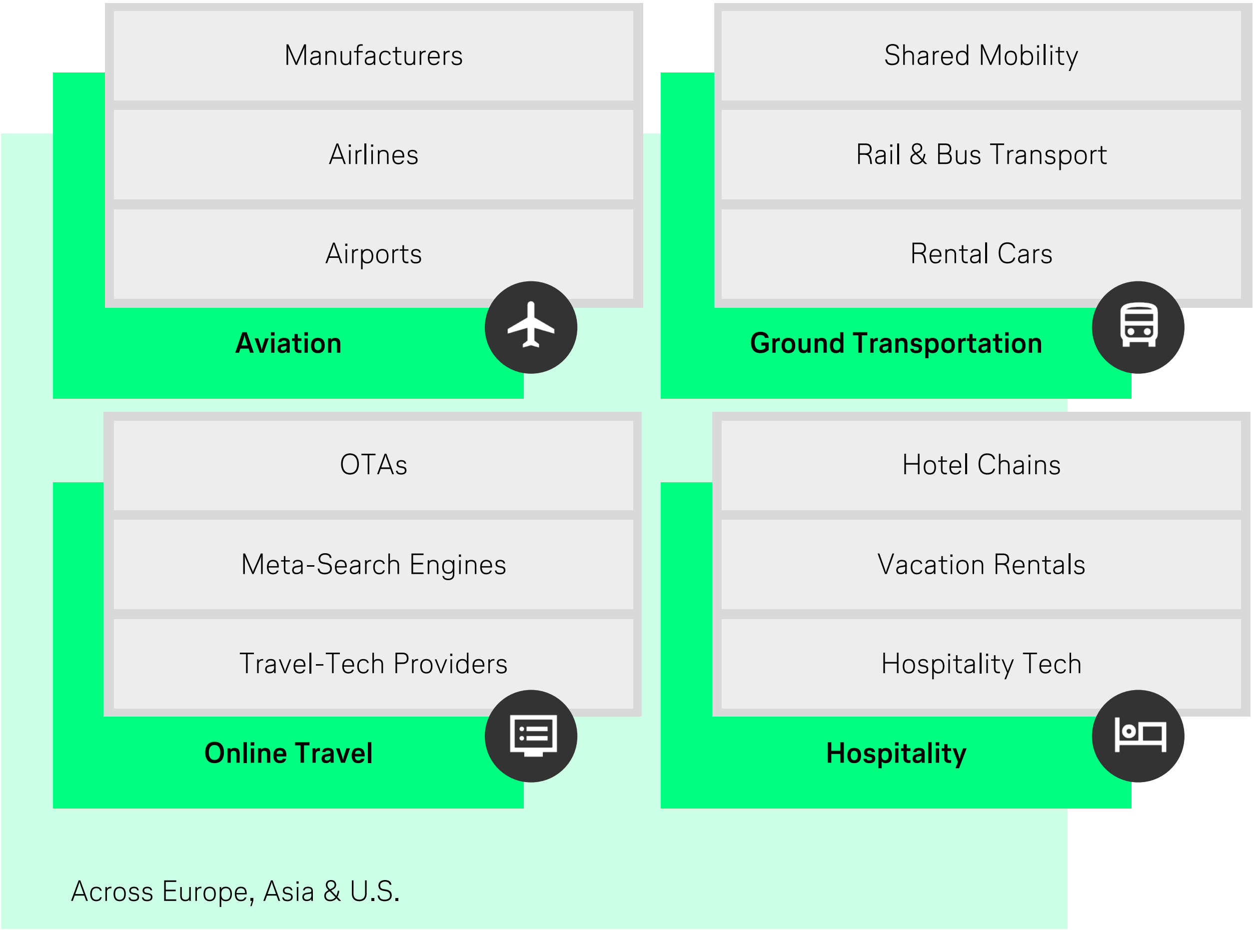
TRAVEL AND MOBILITY CORPORATES SHOW RESILIENCE

From a macro perspective, the investment landscape of travel and mobility corporations stands in clear contrast to the venture capital scene, where there's been a notable decline in funding since 2018–see page 3. Unlike VC investments, which have significantly declined, corporate investment within travel and mobility has demonstrated a remarkable level of stability, in both the total value of funding and the number of deals–see the chart on the left. It's important to acknowledge a noticeable dip in 2020, a direct result of the pandemic's impact which temporarily froze corporate budgets earmarked for growth initiatives.

However, this decline was short-lived. By 2021 and continuing into 2022, investment activities surged back to nearly pre-pandemic levels. This resurgence was likely fueled by a steady recovery in the travel sector, prompting corporations to capitalize on the rebound and channel profits back into strategic growth opportunities. Despite this resilience, it's crucial to note that 2023 witnessed a slight downturn in investment activities, indicating that even the robust travel and mobility sector is not immune to the broader economic challenges. This downturn reflects a strategic tightening of investment belts, as corporations adapt to a more uncertain economic climate.

Our Methodology

SELECTION OF 60 CORPORATIONS ACROSS TRAVEL AND MOBILITY



A GLOBAL VIEW OF TRAVEL AND MOBILITY TECH

Travel and mobility corporations are deeply invested in the industry, possessing an intimate understanding of its major challenges and trends, and a profound desire to drive innovation. While innovation isn’t solely about external investment—many large organizations fuel innovation internally through dedicated R&D projects and funds—it's challenging to track how these internal funds are allocated due to a lack of transparency. Therefore, we've chosen to measure "external" innovation momentum by monitoring investment activities from the 60 largest travel and mobility companies.

These incumbents and scale-ups, given their size and relevance, are spearheading innovation at an industry level. We handpicked these 60 corporations across the four main travel and mobility segments to provide a comprehensive and representative overview of the entire industry. Our criteria for tracking “strategic investments” encompass investments into emerging target companies, mostly startups, characterized by their development of new technologies and/or launching truly innovative products and services with the potential to innovate the status quo in the industry. Overall, our analysis covers more than 1,200 investment deals since 2018–one of the most extensive investment analysis of active travel and mobility companies to date.

Our Analysis

CATEGORIZATION OF INVESTMENT DEALS BY TRAVEL AND MOBILITY CORPORATIONS

Operational Efficiency

Investments focus on technologies and products that potentially streamline internal processes, reduce costs, and enhance the efficiency of the corporate value chain.

Expansion

Investments aimed at increasing market presence through internal inventory or brand acquisitions, diversifying into adjacent market segments or new markets for external growth.

Sustainability

Investments target technologies and products that promote more sustainable practices, including emissions monitoring, carbon offsetting, fleet electrification, and the development of sustainable fuels.

(Digital) Consumer Experience

Focuses on enhancing the consumer experience through digital innovations, such as livestreaming, new booking channels, innovative payment methods, and revamped loyalty programs.

1,200+ investment deals, all deal types (CVC, M&A, etc.)

DECODING CORPORATE INNOVATION PRIORITIES

Investment decisions by large corporations are inherently unique, reflecting the strategic priorities of the investing entities. In today's travel and mobility corporate landscape, these decisions typically align with one of four overarching strategies, according to our market analysis: Raising Operational Efficiency, Enabling Market Expansion, Increasing Sustainability Impact, or Enhancing the Digital Consumer Experience.

To systematically analyze the strategic focus of travel and mobility corporations, we categorized each of their 1,200+ investment transactions into one of these four strategic "priority buckets." This method allows us to identify clear patterns in the investment behaviors of these companies and determine which innovation priorities are steering their financial engagements.

Additionally, by comparing investment activities in these four priority areas across the various sub-sectors of travel and mobility companies, we gained insights into the strategic growth bets that different stakeholder groups within the industry are making.

Executive Summary: The Nine Truths

Macro Truths

1 Two Investment Leaders

The willingness of travel and mobility corporations to innovate through investments is undeniable. However, aviation and ground transport players dominate the corporate investment landscape, consistently contributing up to 70% of the annual deal count, underscoring their pivotal role in driving industry-wide external innovation more so than online travel providers and hospitality companies.

2 Varied Investment Priorities

Expansion and Operational Efficiency are key focus areas across all travel and mobility sectors, driving growth and process improvements. Aviation and ground transport lead in the number of sustainability investments due to regulatory pressures. In contrast, online travel and hospitality show minimal investment in sustainability, indicating an area ripe for innovation.

3 AI: The Common Denominator

Artificial Intelligence reveals itself as a unifying force across the diverse investment strategies of travel and mobility corporates. AI companies have attracted more than half of all technology-related investments since 2018. This deep-seated focus on AI is not merely a passing trend but a strategic imperative for reshaping the future of travel and mobility.

Sector Truths

4 Hospitality is Redefining Expansion

While traditionally focused on acquiring assets to expand market share, hospitality companies have started diversifying their investments into adjacent services to enhance the customer experience. This expansion strategy targets complementary sectors such as tours and travel-related services. However, economic pressures in 2023 led to a decrease in such investment activities.

5 OTA Dynamics: (Asian) Consolidation

OTAs have aggressively pursued expansion, with a significant spike in consolidation in 2021, driven by the pandemic travel downturn. Post-pandemic, OTAs continue to expand into new travel segments. Notably, Asian investors have propelled investment activities most recently, capitalizing on the region's delayed travel recovery.

6 Ground Mobility's Need For Growth

The focus of the ground transport sector, notably ride-hailing and micro-mobility, continues to be on market expansion to outperform peers in a highly competitive market. However, given economic shifts, players are diversifying their investments into electric infrastructure and non-mobility sectors like payments.

Aviation Truths

7 Aviation's Unique Investment Approach

The aviation sector stands out with a primary focus on operational efficiency, driven by the industry's operational challenges. Expansion is becoming more limited due to stringent regulatory controls and the sector's thin profit margins. Remarkably, aviation's footprint in climate-focused investments is growing.

8 Aviation Aiming For Operational Excellence

Aviation investments heavily prioritize core operations, with 40-50% of investments across years aiming to enhance operational efficiency. This focus reflects a strategic approach to mitigate significant costs and labor shortages through advanced technology and automation.

9 Aviation's Debatable Sustainability Focus

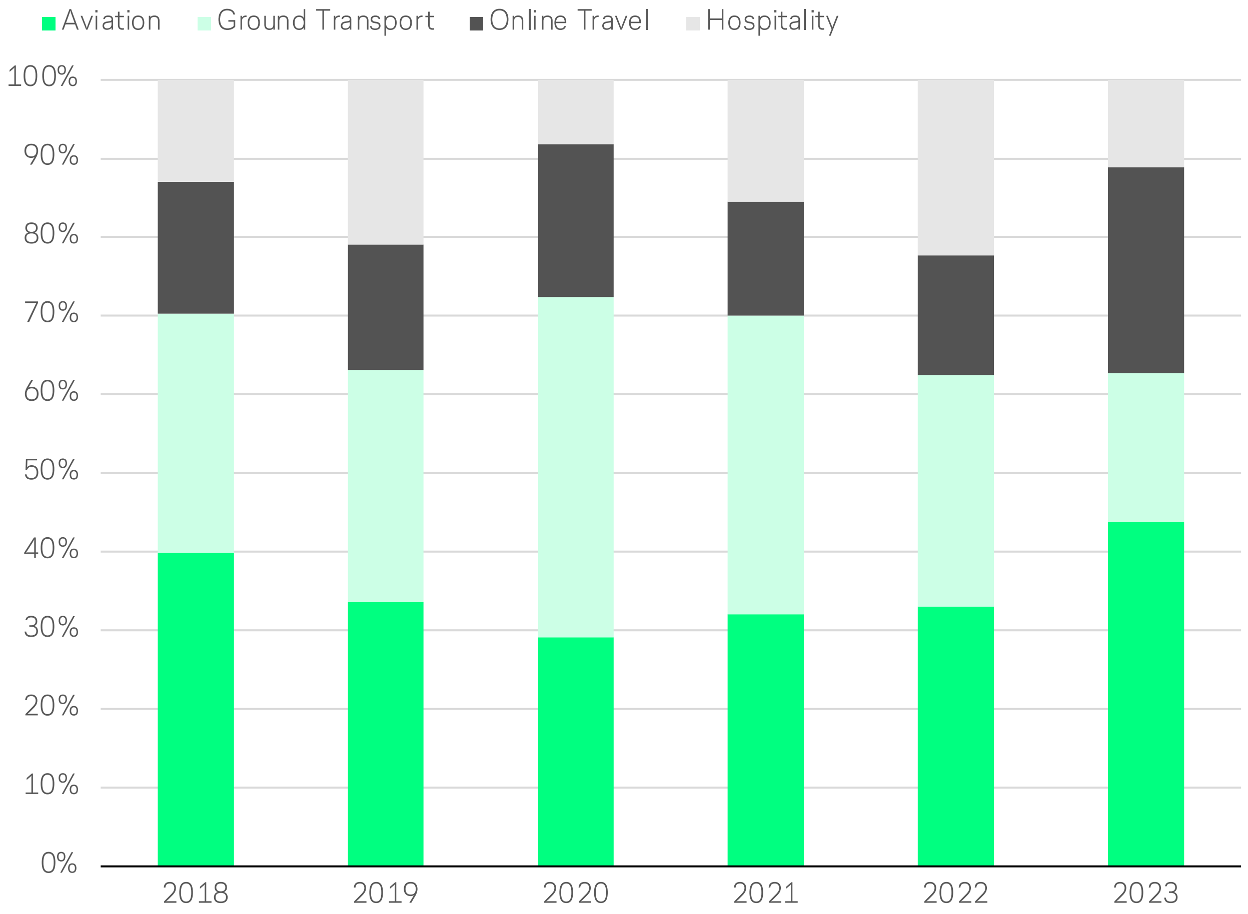
Aviation's sustainability investments have tripled since 2019, now accounting for over 30% of all deals, driven by the need to decarbonize and the unique agendas of investment houses like United Airlines Ventures. The focus on electric aviation, sustainable fuels, and emissions management underscores a commitment to environmental stewardship.

Insight #1

Aviation and Ground Transport companies are the most active corporate investors.

Corporate Investment Activity Varies Across Travel and Mobility Sectors

DEAL ACTIVITY (# DEALS) OF TRAVEL AND MOBILITY CORPORATES BY SUB-SECTOR



Sources: Lufthansa Innovation Hub, TNMT.com, PitchBook Data Inc.

INVESTMENT LEADERS: AVIATION & GROUND TRANSPORT

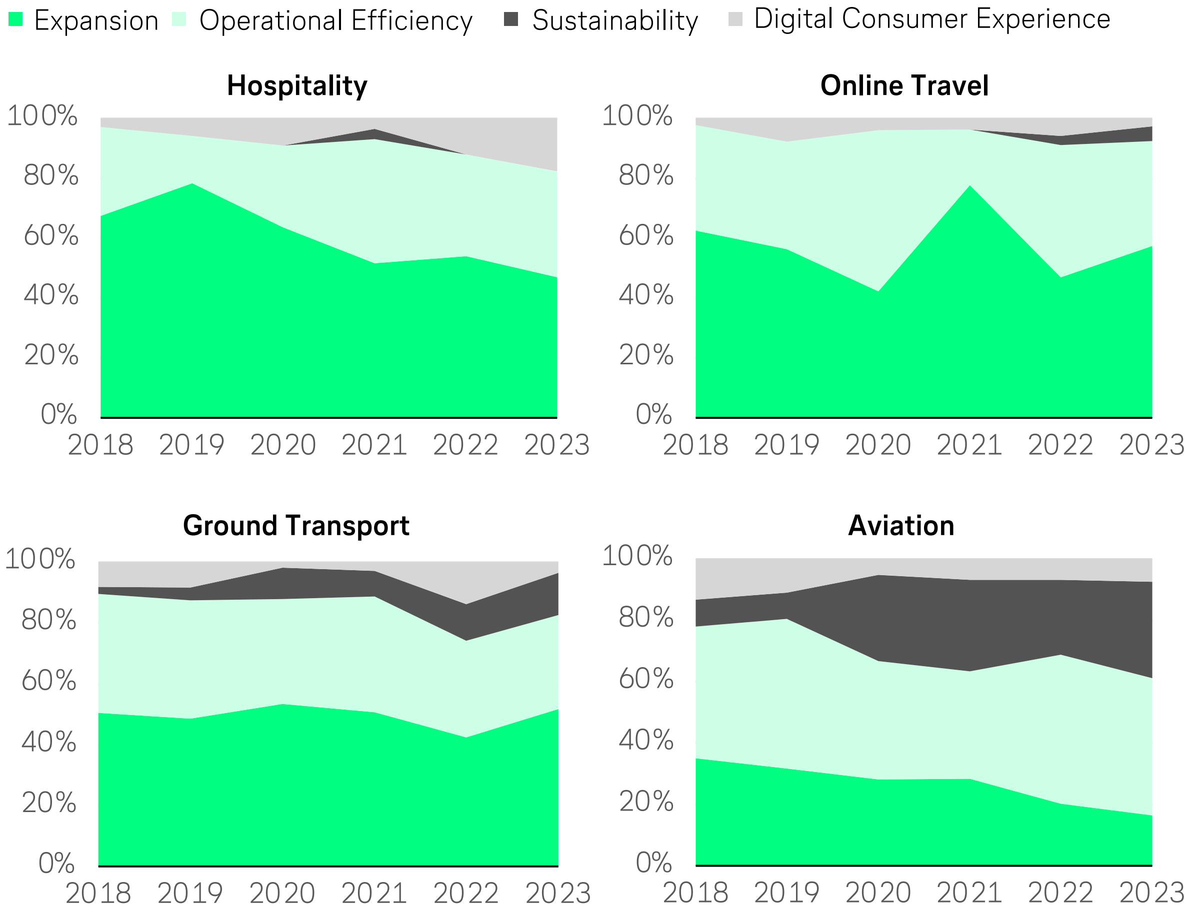
A closer look at investment activity within the travel and mobility corporate sector reveals that aviation and ground transport primarily drive the stability previously discussed. These verticals consistently make up 60 to 70% of deals per year. Corporate venture capital funds and structured investment strategies have been firmly established by entities within these asset-heavy industries over the last decade. Given the lengthy innovation cycles in these sectors—for instance, the lifespan of an aircraft can exceed 30 years—innovation tends to be incremental and internal innovation cultures may become somewhat conservative. This is likely a key driver for these sectors' focus on external investments to foster innovation. Key players in aviation, including Boeing's AEI HorizonX, Aerospace Xelerated, Airbus Ventures, and JetBlue Ventures, have executed over 180 investments in the last five years. In ground transport, significant activities are noted from JR East Startup, Argor Capital (formerly Go-Ventures), Gojek Ventures of the GoTo Group, and Grab Ventures, with more than 70 deals in the same period. Although online travel and hospitality sectors participate in investments, their numbers are lower, and the lack of institutionalized funds suggests that investments are seen more as opportunistic tools rather than essential elements for innovation, contingent on financial availability.

Insight #2

Strategic investment priorities differ across travel and mobility segments – but not entirely.

Travel and Mobility Sectors Have Distinct Strategic Investment Priorities

DEAL ACTIVITY (#) OF TRAVEL AND MOBILITY SUB-SECTORS, BY PRIORITY AREA



Sources: Lufthansa Innovation Hub, TNMT.com, PitchBook Data Inc.

THE COMMON PATTERNS OF CORPORATE INVESTING

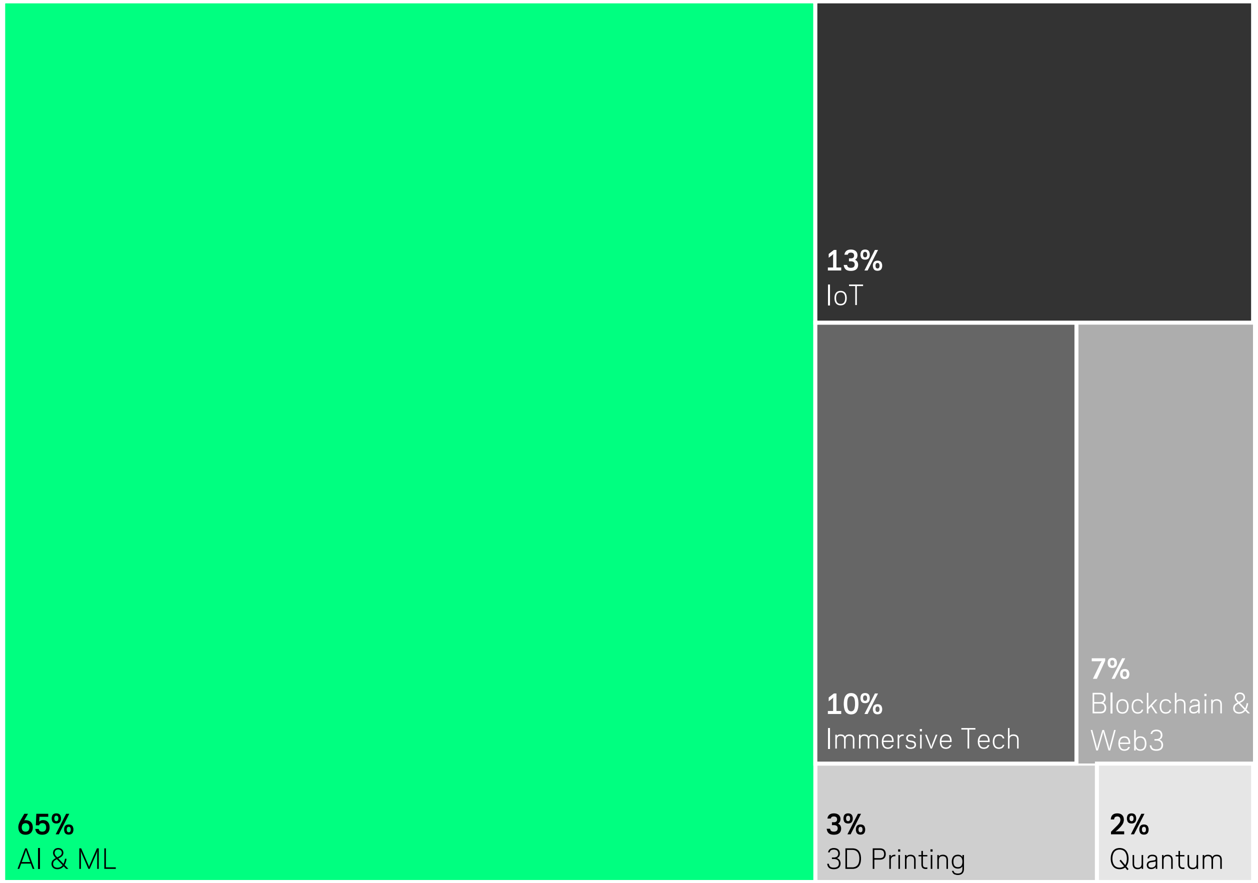
Examining the investment priorities across travel and mobility sectors, we notice clear trends and differences. **Expansion** is a key investment focus across all sectors, reflecting a widespread strategy aimed at increasing market share or expanding into new market segments. This approach is a fundamental aspect of corporate growth strategies and is consistently prioritized across all our sectors of interest. **Operational Efficiency** follows closely as a common investment theme, with companies investing in technologies and platforms that streamline internal processes and enhance the efficiency of their value chains. This reflects a broad commitment to solving operational challenges through digital transformation. **Sustainability** presents a contrasting picture between sectors. Aviation and Ground Transport, both asset-heavy and environmentally impactful, have shown a stronger commitment to sustainability investments, likely driven by increasing regulatory pressures and public scrutiny. Conversely, Online Travel and Hospitality lag in this area. Lastly, investments in the **Digital Consumer Experience** are relatively minor across the sectors. Most companies manage customer-facing innovations internally, possibly explaining the low external investment in this area. However, given the current low customer sentiment, especially in the airline industry, this area represents a significant opportunity for enhanced focus and investment.

Insight #3

AI is the leading investment area across the corporate travel and mobility landscape.

AI: The Most Pivotal Technology Area Across Travel and Mobility Sectors

TECHNOLOGY-FOCUSSED DEAL ACTIVITY (#) OF TRAVEL AND MOBILITY CORPORATIONS, BY TECHNOLOGY AREA, SINCE 2018



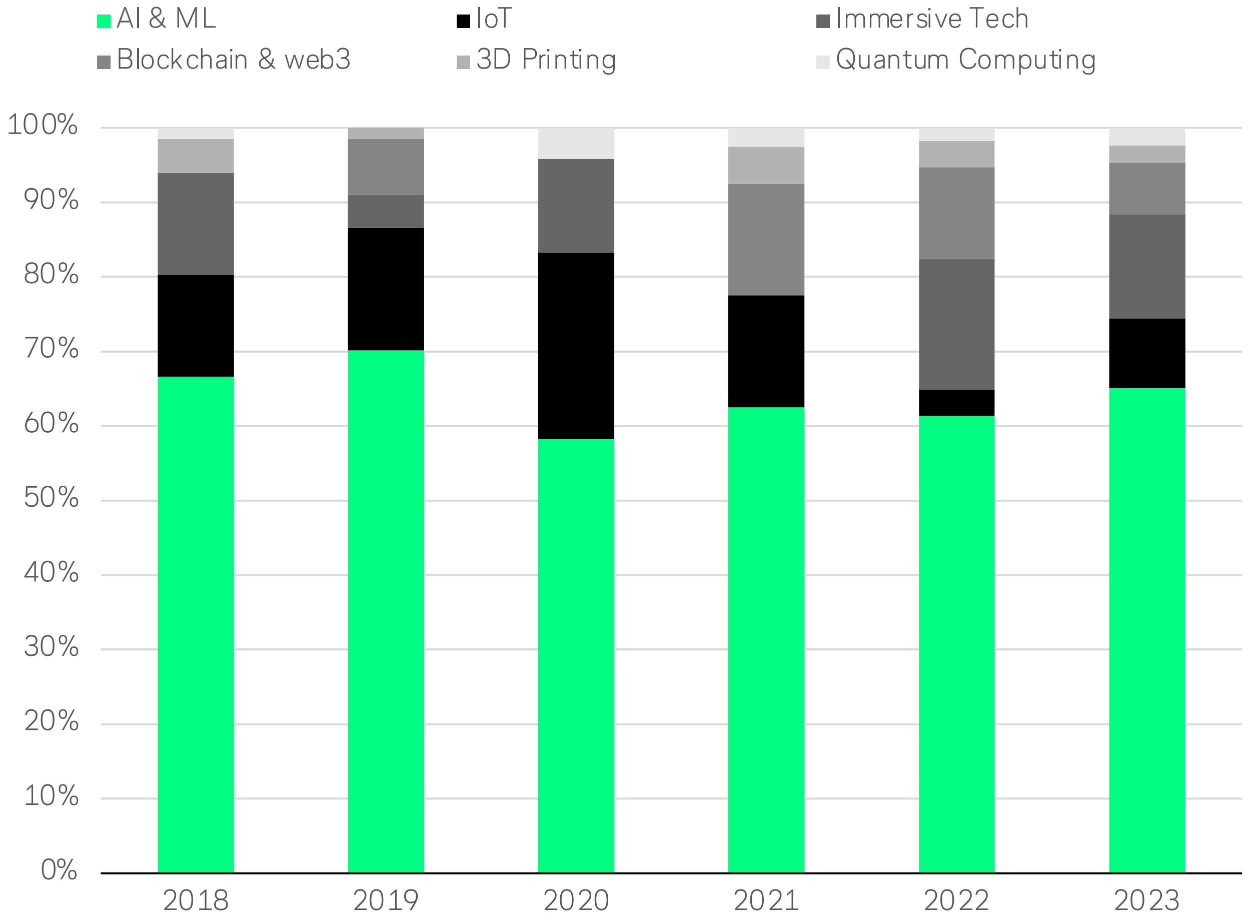
Sources: Lufthansa Innovation Hub, TNMT.com, PitchBook Data Inc.

A UNIFIED THEME IN DIVERSE STRATEGIES

Despite slightly differing investment strategies across the four main sectors in travel and mobility, one theme unites them all: a significant focus on Artificial Intelligence (AI) and Machine Learning (ML). How did we find out? Our investments analysis involved filtering investments for companies differentiating themselves based on technological capabilities. Among this subset of investments, AI and ML attract two-thirds of all sector investment deals since 2018, underscoring their pivotal role in driving forward-looking innovations. These investments span several transformative applications, such as: **Autonomous Driving:** Many investments target companies specializing in computer vision and LIDAR systems, essential for the development of autonomous vehicles. **Robotics and Drones:** Focused on automating manufacturing processes and refining delivery systems, these investments reflect a push towards enhanced operational efficiencies. **Predictive Analytics:** Targeting firms that leverage AI and ML algorithms to optimize processes, these investments aim to refine decision-making and increase operational agility. **Customer Support:** Enhanced by natural language processing and large language models, investments in this area strive to revolutionize how companies interact with customers, making these interactions more intuitive and efficient.

The Innovation Focus on AI is Not New – Pragmatism Outweighs Hype

TECHNOLOGY-FOCUSSED DEAL ACTIVITY (#) OF TRAVEL AND MOBILITY CORPORATIONS, BY TECHNOLOGY AREA, ANNUALLY



Sources: Lufthansa Innovation Hub, TNMT.com, PitchBook Data Inc.

A LONGSTANDING PRIORITY IN TRAVEL AND MOBILITY

Despite the recent surge in popularity surrounding AI, specifically Generative AI, the focus on AI across the travel and mobility sectors is not a new trend. Our analysis of the distribution of investments with a technology focus over the years reveals that this emphasis on AI is far from being a recent phenomenon.

AI investments have consistently represented a significant portion of technology investments by travel and mobility corporations, accounting for 60 to 70% annually over the last six years. This consistency underscores the sector's long-standing commitment to AI as a pivotal technological pillar across various subsectors of Travel and Mobility Tech.

Such sustained investment levels indicate that our industry recognizes AI's transformative potential not merely as a tool for incremental improvements but as a fundamental driver of future growth and innovation. Our sector is clearly not just riding a wave of AI hype but is deeply invested in leveraging AI to reshape the landscape of how people get from point A to point B.

How exactly? Let's look at some examples on the next page.

Travel and Mobility Players Invest Across Several GenAI Use Cases

SELECTED AI INVESTMENT TARGETS BY TRAVEL AND MOBILITY CORPORATES SINCE 2022

Analytics & Fraud Detection
- InstaDeep™
- UrbanFox
- DataHawk

Maintenance Ops
- AMYGDA
- LEXX
- datch

Industrial
- ToffeeX
- Basetwo
- sparkcognition

Customer Support
- nlx
- PurpleCloud Technologies
- PolyAI

Sources: Lufthansa Innovation Hub, TNMT.com, PitchBook Data Inc.

FOUR KEY AREAS OF GEN AI INVESTMENTS

To gain deeper insights into how AI, particularly Generative AI, is poised to reshape the travel and mobility landscape, we examined the latest investments made by travel and mobility corporations in AI companies. Our analysis reveals that these corporations made approximately a dozen notable investments specifically in Generative AI. These investments are primarily distributed across four key application fields.

As anticipated, one of these fields centers on customer support through Generative AI-powered chatbot interfaces. While this area directly impacts customer interactions, three other fields show significant investment momentum, highlighting the broader relevance of GenAI beyond improving customer experiences. These fields are focused on enhancing operational efficiency within companies, such as optimizing maintenance operations.

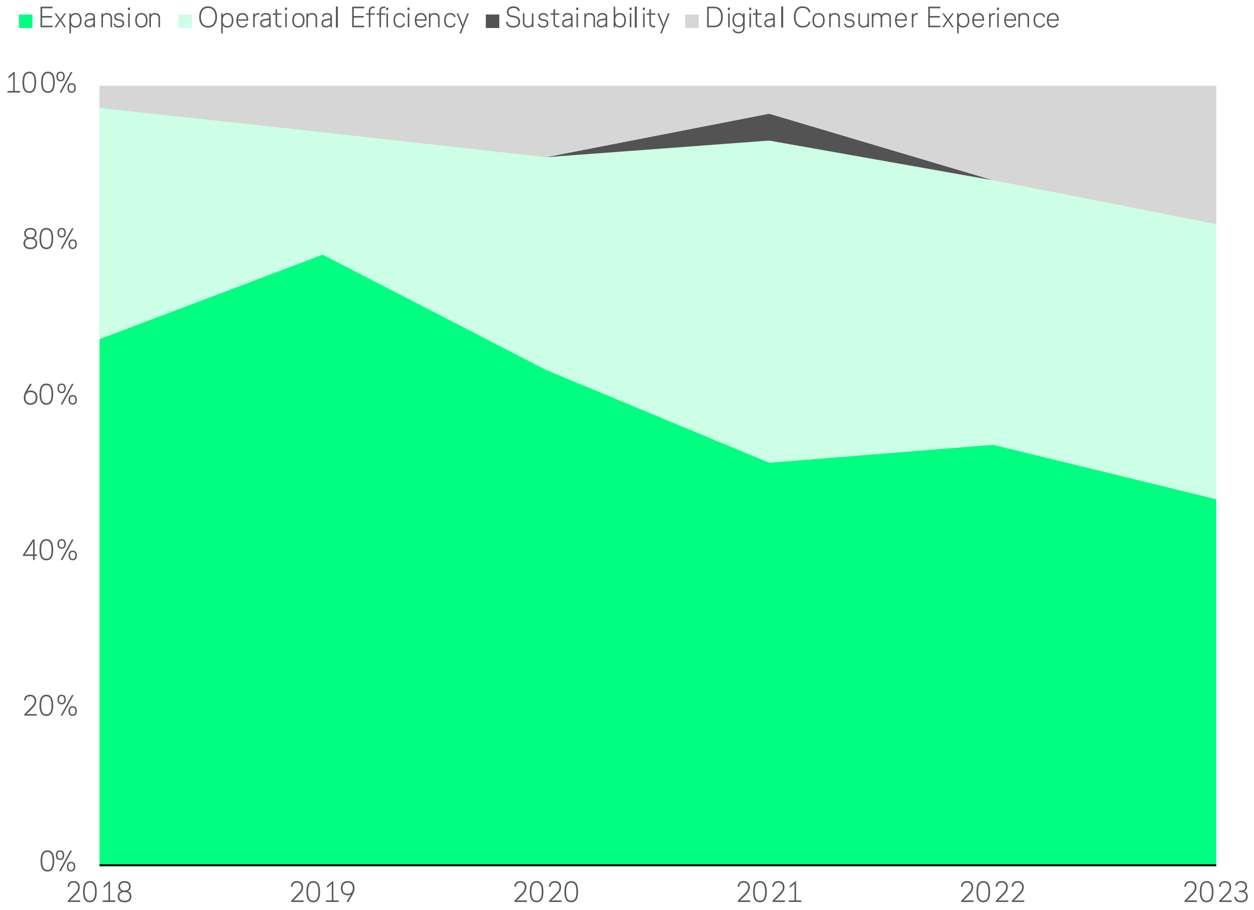
Among all sectors, aviation companies stand out for their emphasis on mastering operational excellence, driving investments in AI technologies aimed at streamlining processes and workflows. For deeper insights into this trend, refer to the forthcoming section dedicated entirely to aviation, starting on page 28.

Insight #4

For Hospitality, it’s (mostly) all about growth.

Asset-Based Expansion Is the Classic Modus Operandi in Hospitality but Priorities Are Shifting

DEAL ACTIVITY (#) OF HOSPITALITY CORPORATIONS, BY PRIORITY AREA



Sources: Lufthansa Innovation Hub, TNMT.com, PitchBook Data Inc.

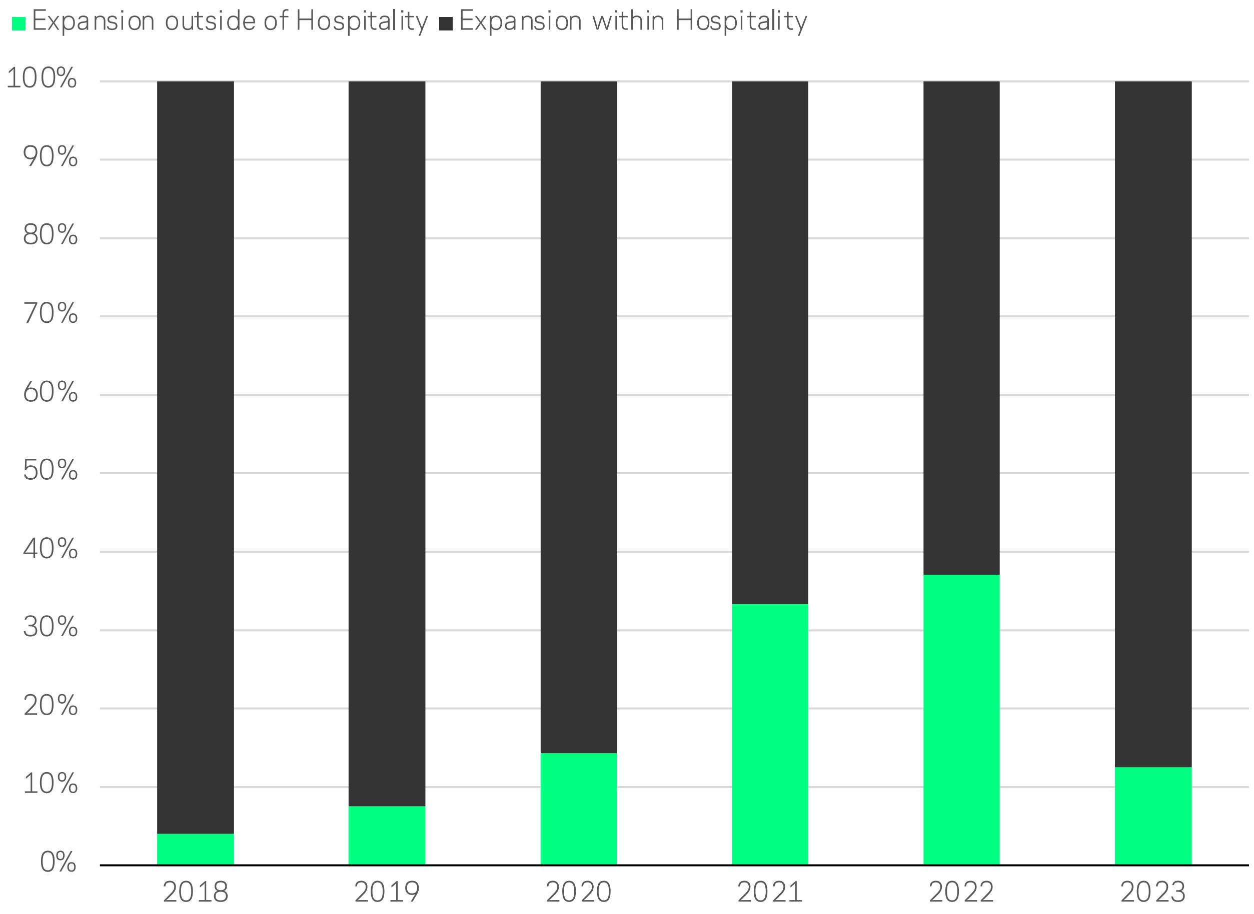
FROM EXPANSION TO OPERATIONAL EFFICIENCY

Hospitality is notable for having the fewest deals among travel and mobility sectors (see page 10), yet it prominently focuses on market expansion. This aligns with the traditional playbook in hospitality, where hotel chains often grow by acquiring competitors' hotels, brands, or inventories to boost market share, favoring this approach over the complexities and high costs of starting entirely new hotel locations from scratch.

However, the trend towards expansion is slowing down. Since 2019, there has been a notable shift towards investments in operational efficiency by hospitality corporations. Why this change? The pandemic's impact prompted hospitality companies to look inward, optimizing processes and reducing costs to survive. This focus has persisted into the post-COVID era, where automation has become particularly critical, especially in the face of ongoing staff shortages. According to Hospitalitynet, four out of five US-based hotels are grappling with staffing crises. The situation is similarly challenging in Europe, where 43% of hoteliers view hiring and retaining staff as the major challenge. One illustrative example is the Huazhu Hotels Group's investment in Blue Sky, an IoT platform designed for smart rental and washing services, showcasing a strategic pivot towards leveraging technology to address operational challenges.

Hospitality Players Are Looking to Increase Their Footprint Across the Traveler Journey

DEAL ACTIVITY (#) OF HOSPITALITY CORPORATIONS INTO EXPANSION, BY TYPE



Sources: Lufthansa Innovation Hub, TNMT.com, PitchBook Data Inc.

HOSPITALITY GOES BEYOND TRADITIONAL BOUNDARIES

In the hospitality sector, expansion traditionally involves acquiring other hotels or hospitality services to increase market share. However, our analysis from 2018 to 2023 reveals a shift in this pattern. Hospitality companies have increasingly focused their expansion efforts on investments in startups that offer tours, experiences, and other travel-related services outside of traditional hospitality. This trend is interpreted as both a pandemic-induced strategy to diversify revenue streams and a strengthened focus on enhancing customer experiences. Investments in areas such as luggage tracking, personalized recommendations, and guest messaging platforms extend the hospitality experience along its entire value chain, providing significant added value to customers.

However, this shift was notably disrupted in 2023, mirroring a broader trend in the sector characterized by a significant reduction in deal activity. This downturn is likely due to several macro factors, including heightened cost pressures from rising energy prices and inflation, and critical staff shortages. As a result, the sector appears to be refocusing on its fundamental business needs, scaling back its investment scope beyond traditional hospitality services.

Hospitality Players Invest Across the Entire Traveler Journey

Selected hospitality sector investments since 2022

Booking and Inspiration	Transportation	Accommodation	Add-on Services	Experiences
kurz-mal-weg.de #1 für Kurzreisen	**Akasa Air**	**Samara**	**insured nomads**	**lido 2 Paris**
• Online travel booking service for short trips • Acquired by HomeToGo in Jan. 2024	• Low-cost airline based in India • Raised 47M USD in early- stage funding from Airbnb and others.	• Backyard units for living expansion and vacation rentals • Raised more than $40M from Airbnb	• Insurance for remote workers • Raised 2M USD from various investors including Draper Startup House	• Musical theatre in Paris • Acquired by Accor in February 2022
NOMI	**alltheway**	**whistle**	**Potel & Chabot Paris**	**City Guyd**
• Personalized travel recommendations • Acquired by Mews in October 2023	• Collection and check-in service for luggage • Raised 1M USD in seed funding from Accor	• Guest messaging platform for hotels • Acquired by Cloudbeds in June 2022	• Catering and event organization for events • Acquired by Accor in October 2023	• Insurance for remote workers • Raised 100k USD from Draper Startup House Accelerator

Sources: Lufthansa Innovation Hub, TNMT.com, PitchBook Data Inc.

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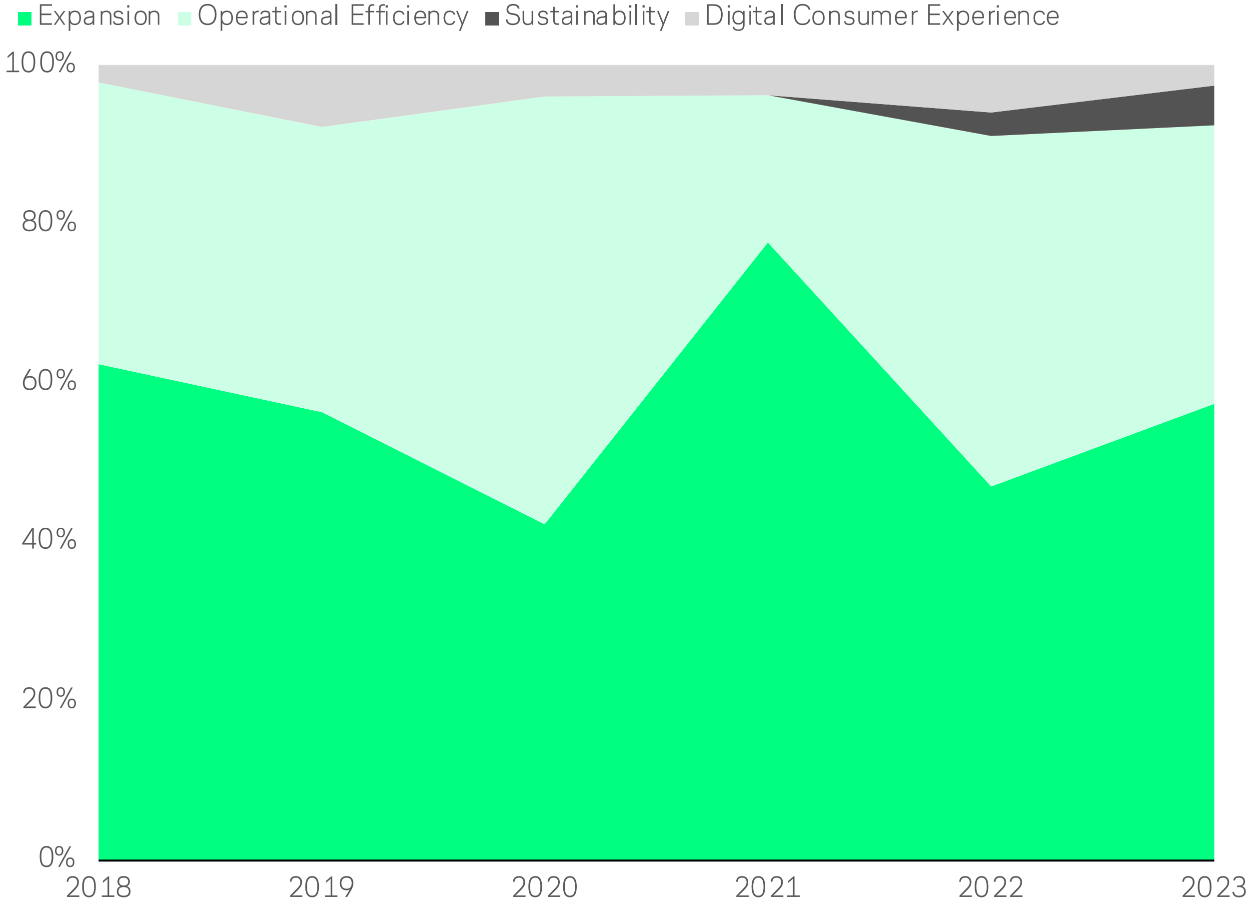
Insight #5

Online Travel experiences unprecedented consolidation.

Pandemic-Spurred Consolidation Disrupts the Online Travel Landscape

DEAL ACTIVITY (#) OF ONLINE TRAVEL CORPORATIONS, BY PRIORITY AREA



Sources: Lufthansa Innovation Hub, TNMT.com, PitchBook Data Inc.

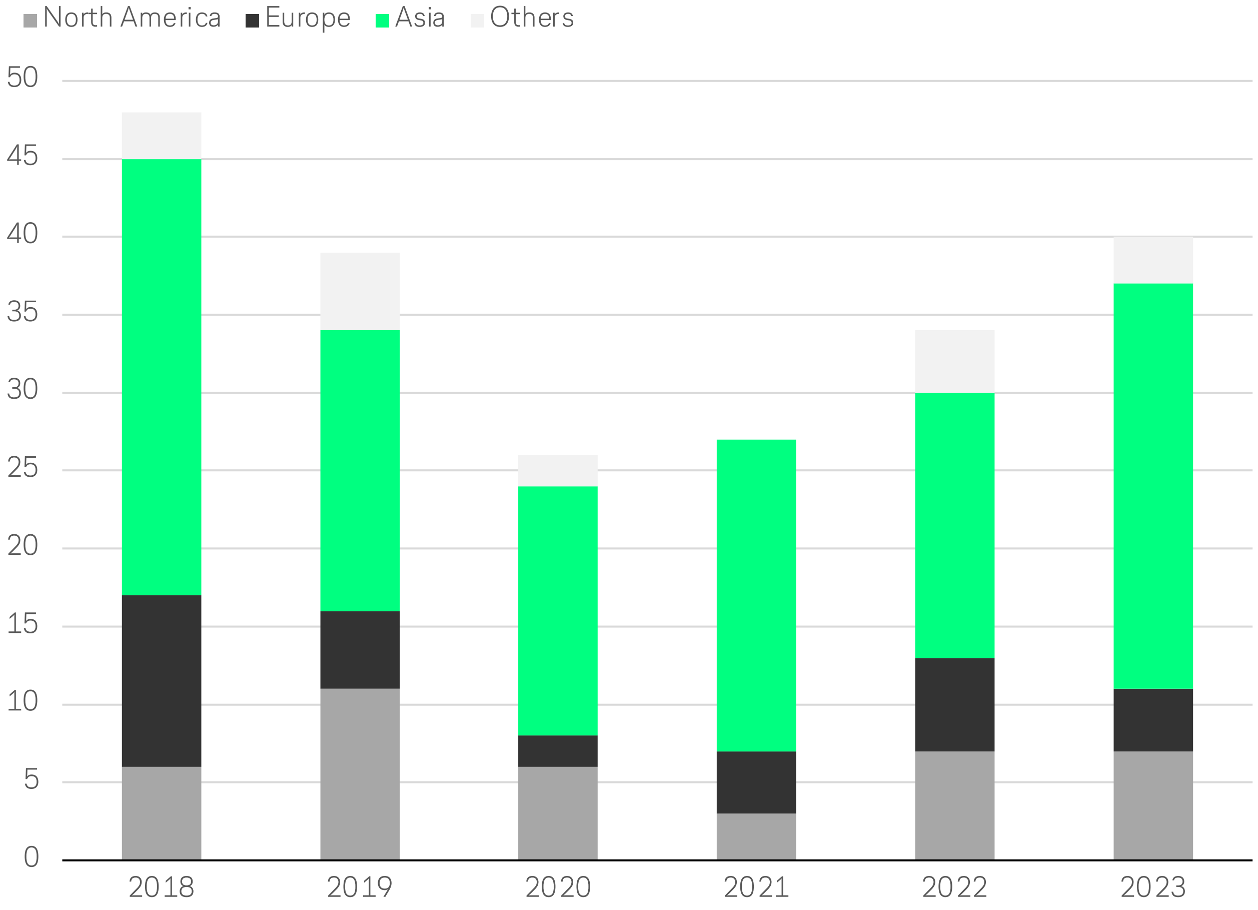
SIZE MATTERS IN THE OTA GAME

Online Travel Agencies (OTAs) thrive on volume. Their business models hinge on expansion to capture increasing market shares. The pandemic's dramatic impact on travel led to a sudden surge in consolidation activities in 2021, as major players seized the opportunity to strengthen their local presence or expand into new markets. Some notable transactions during this period included: In April 2020, Trip.com solidified its position by acquiring Travix, an online travel company based in Amsterdam, enhancing its operations across 35 countries. Despegar, a leading OTA in Latin America, acquired Best Day Travel, a Mexican competitor, in October 2020 to bolster its regional influence. Booking.com expanded its US portfolio by acquiring Getaroom in December 2021.

While 2022 saw a moderation in M&A activities, expansion strategies continue to dominate the sector's narrative. Reflecting a similar trend observed in the hospitality sector, OTAs are increasingly venturing into adjacent travel segments to diversify their offerings. For instance, Despegar acquired Stays.net to broaden its vacation rental services, Trip.com invested in nature holiday camp operator Sunshine Valley, and Amadeus Ventures supported Busbud with an $11 million deal, moving towards integrated mobility solutions.

Online Travel Investment Activity is Dominated by Asia's Mega Players

DEAL ACTIVITY (#) OF ONLINE TRAVEL CORPORATIONS, BY REGION



Sources: Lufthansa Innovation Hub, TNMT.com, PitchBook Data Inc.

ASIAN INVESTORS DRIVE DEAL ACTIVITY

Among the four segments analyzed, online travel is the only sector that witnessed an increase in investment activity from 2022 to 2023, continuing to grow despite macroeconomic challenges such as high inflation and macro geopolitical risks. Notably, this growth is not driven by investment activity in Europe or North America. Instead, the majority of deals in the online travel sector are flowing into Asia-based companies—a trend consistent from 2018 to 2023, where Asian investment targets attracted the highest number of deals.

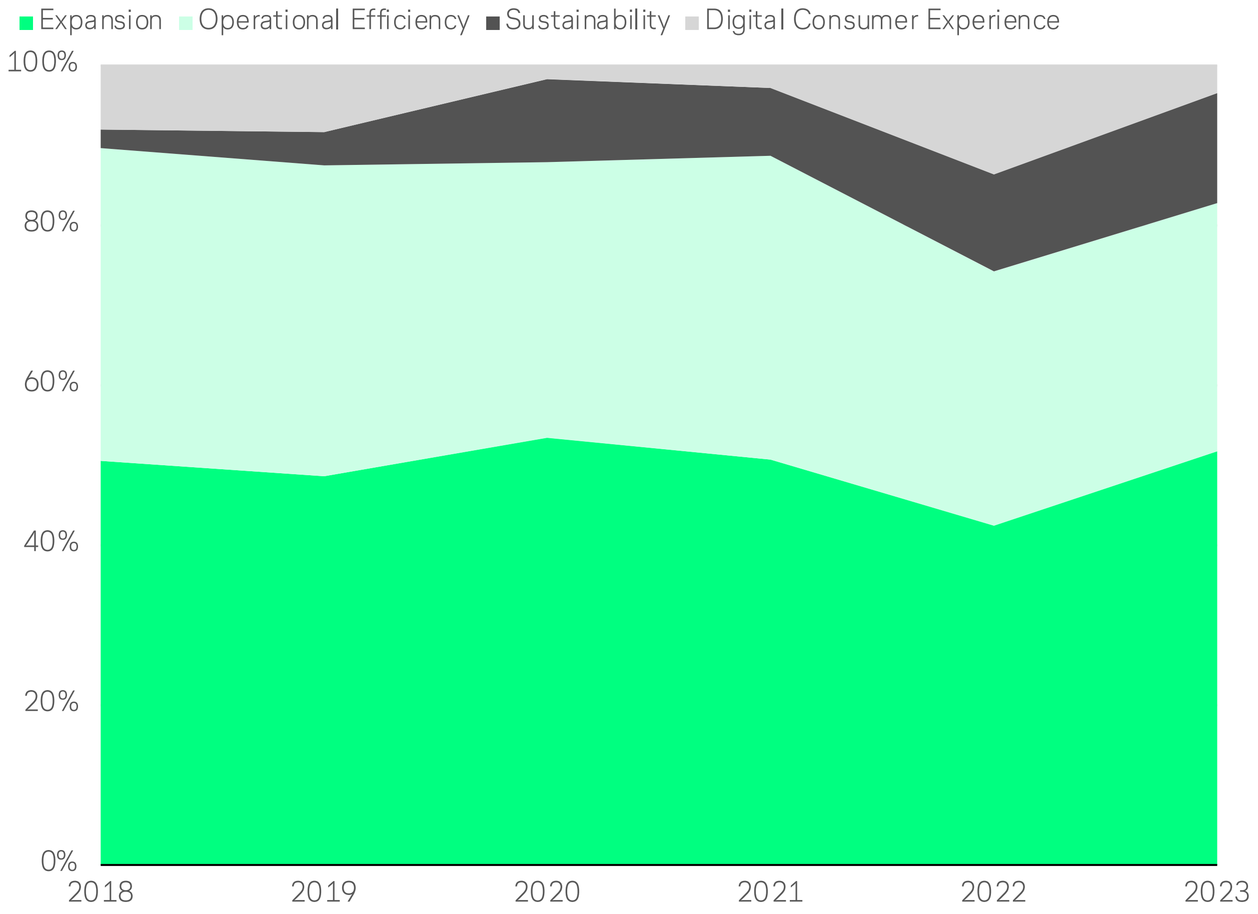
This trend can be attributed primarily to the significant influence of two major regional players: AirTrip, a leading OTA from Japan, and Yanolja alongside Yanolja Cloud, a travel-tech platform associated with the Korean OTA. These two entities alone accounted for over 70% of investments into Asian companies in 2023. Furthermore, Asia's travel recovery initially lagged behind Europe and North America, with some of the region's major economies only reopening to tourism in 2022. This delay has since translated into a rapid resurgence in travel demand, prompting local players to capitalize on this opportunity. Consequently, Asian investors ramped up their investment activities in 2023, contrasting the reductions seen by their European and North American counterparts.

Insight #6

For Ground Transport providers, the credo is to go big or home.

Winner-Takes-All Environment Fuels Never-Ending Expansion in Ground Transportation

DEAL ACTIVITY (#) OF GROUND TRANSPORT CORPORATIONS, BY PRIORITY AREA



Sources: Lufthansa Innovation Hub, TNMT.com, PitchBook Data Inc.

EXPANSION DICATES INVESTMENT STRATEGY

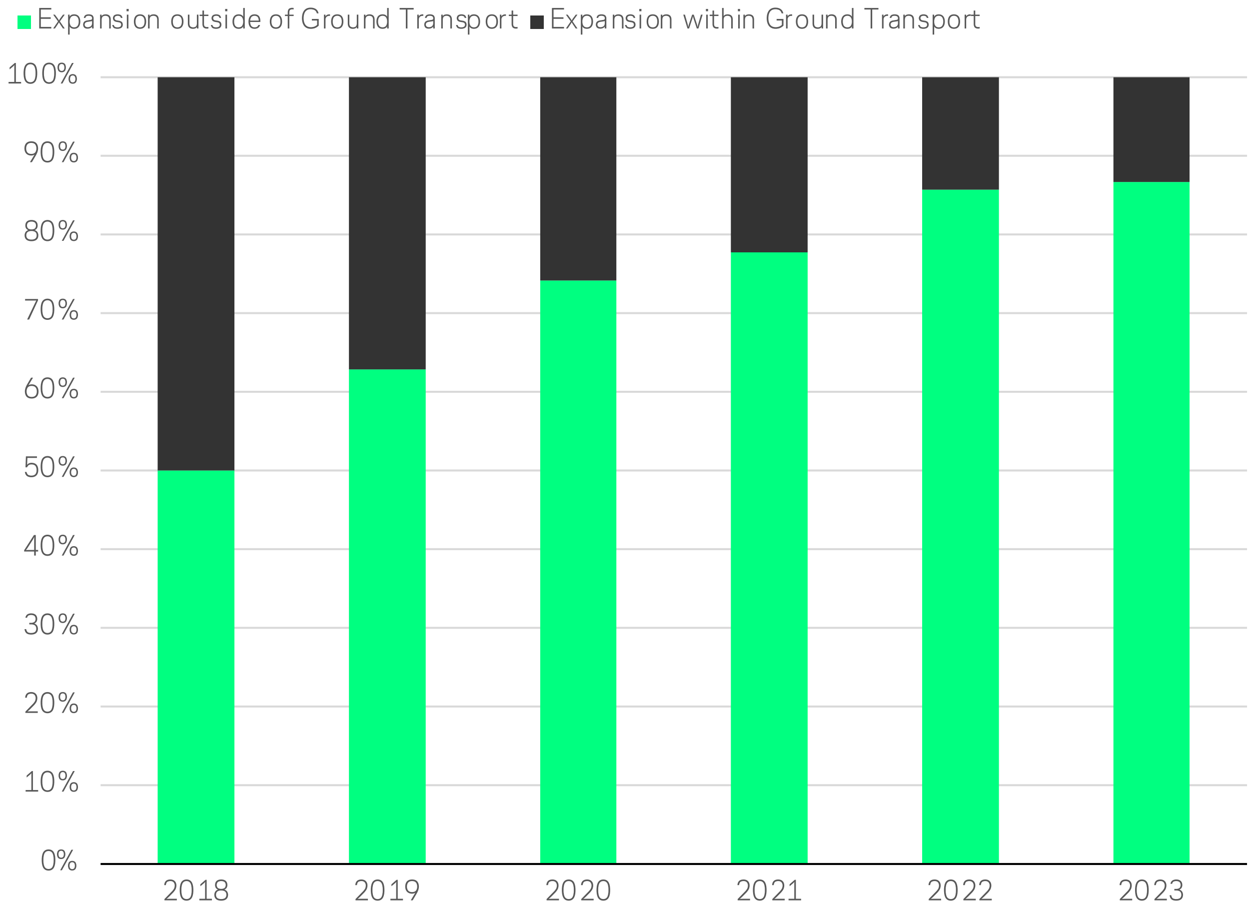
Ground transportation, predominantly consisting of shared mobility providers like ride-hailing and micro-mobility services, has faced significant challenges due to the economic shifts. The rise in capital costs, triggered by interest rate hikes in early 2022, has particularly impacted these companies, whose business models with aggressive expansion plans and low unit economics are highly sensitive to such changes. This led to a notable decline in investment activity in 2022, with a nearly 60% drop in deal count compared to 2021.

Despite these financial pressures, the drive for expansion has not waned. Ground transportation is marked by a strong "winner-takes-all" approach, compelling companies to continuously strive to enter new markets and dominate competitors. This strategy is not just about growth but also about securing market control to potentially adjust pricing strategies in less competitive environments to improve unit economics. Recent moves include:

- Tier's acquisition of German micro-mobility provider NextBike.
- Flixbus's acquisition of Greyhound Lines in the US.
- Uber's purchase of Car Next Door, an Australian ride-sharing platform.

Mobility Players, Particularly in Asia, Aim for Growth Beyond Transportation

DEAL ACTIVITY (#) OF GROUND TRANSPORT CORPORATIONS, BY EXPANSION TYPE



Sources: Lufthansa Innovation Hub, TNMT.com, PitchBook Data Inc.

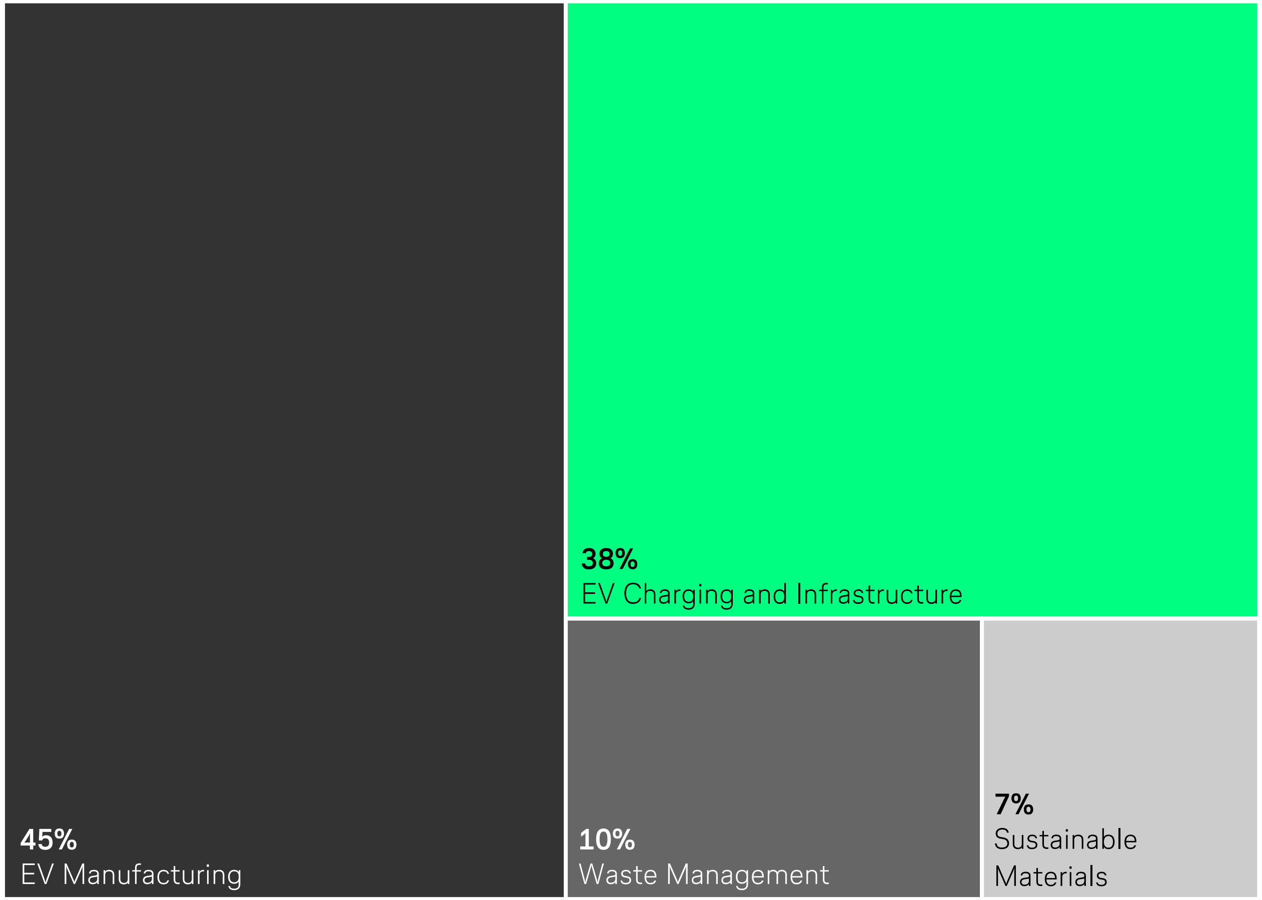
THE DRIVE TOWARDS NEW REVENUE STREAMS

While consolidation within the ground transport sector frequently captures major headlines, our research indicates that this isn't the predominant expansion strategy, at least when investment activity is measured by the number of deals. Ground transport companies are increasingly looking to broaden their horizons beyond traditional transportation. Our analysis reveals a trend where mobility players are diversifying their investment portfolios to enhance their service offerings and potentially open up new revenue streams. Consider these illustrative examples from 2023: Flixbus participated in an $8 million seed funding round for Cleverly, an EdTech startup; Grab made a significant move in the health sector by investing $10 million in Good Doctor Technology, a health and wellness startup.

This trend is particularly pronounced among Asian investors, who are some of the most active in the ground mobility segment. Investment giants such as Grab, and Argor Capital (backed by Gojek) are not only diversifying their portfolios but are also pioneers of the superapp model. Superapps incorporate a wide portfolio of digital services beyond mobility, e.g., financial services. These comprehensive platforms aim to cater to various facets of everyday life, thereby embedding mobility services within a broader digital ecosystem.

Shifting Focus in Ground Mobility's Sustainability Investments

DEAL ACTIVITY (#) OF GROUND TRANSPORT CORPORATIONS INTO SUSTAINABILITY, BY TYPE, SINCE 2018



Sources: Lufthansa Innovation Hub, TNMT.com, PitchBook Data Inc.

BUILDING THE BACKBONE OF ELECTRIC MOBILITY

Historically, ground transportation companies eying sustainability have primarily invested in emerging electric vehicle (EV) manufacturers, reflecting a strategy bullish on consumer demand. This trend is evident in our data, showing that nearly half of all investment dollars going into sustainability from transport providers were targeted at EV manufacturing since 2018.

However, the focus of these investments has been shifting over the last two years. From 2022 to 2023, over half of the investments pivoted towards EV charging infrastructure and battery swapping technologies, indicating a broader regional trend.

For instance, Kakao Mobility and LG Unplus established a joint venture in June 2023 to develop electric charging infrastructure across Korea. Similarly, TIER has backed the UK-based electric vehicle charging platform Bonnet, and Enterprise Holdings invested in Moxion Power, a startup specializing in mobile swappable batteries. These moves underscore a strategic shift in investment priorities, moving from merely enhancing EV technology to building the infrastructure necessary to support the electric transformation of the mobility sector.

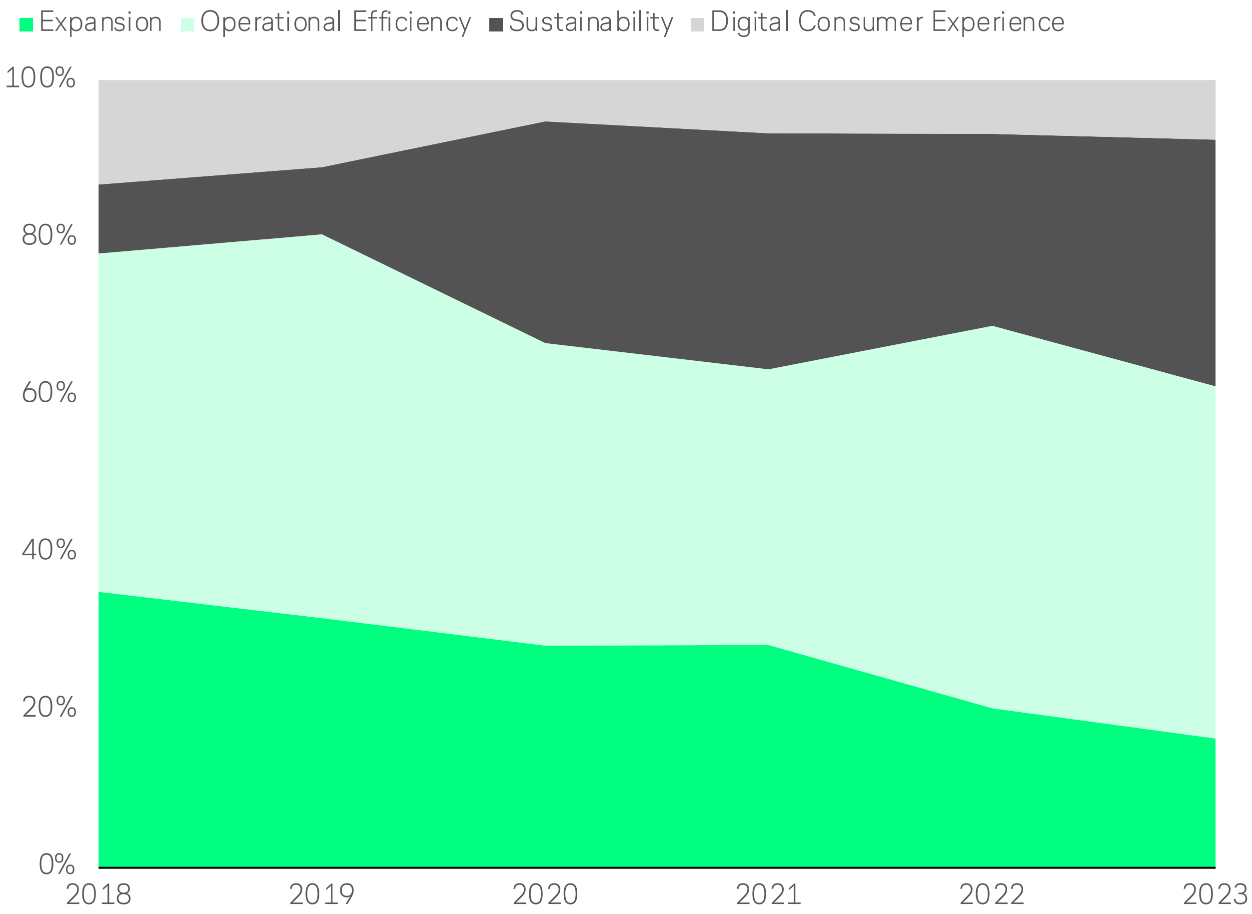
Lufthansa Innovation Hub

Insight #7

Aviation chooses a unique approach to innovation.

Operational Efficiency and Sustainability Take Precedence in Aviation

DEAL ACTIVITY (#) OF AVIATION CORPORATIONS, BY PRIORITY AREA



Sources: Lufthansa Innovation Hub, TNMT.com, PitchBook Data Inc.

AVIATION ADDRESSES ITS KEY CHALLENGES

The aviation sector is distinctive in its investment focus compared to the other travel and mobility sectors. Primarily, the bulk of investments is channeled towards operational efficiency—covering everything from ground operations, to MRO (Maintenance, Repair, and Overhaul), crew training, finance, and revenue management. This focus stems from the high costs associated with flight delays and cancellations, compounded by frequent operational challenges during peak travel periods.

Expansion activities are notably rarer in aviation compared to other segments, largely due to stringent regulatory scrutiny aimed at ensuring fair competition. This regulatory environment has tightened further in 2023, as indicated by new guidelines from the EU Antitrust Commission and the US Administration. Additionally, the sector's thin profit margins, intensified by rising jet fuel prices and labor costs, make it highly competitive and add significant challenges to expanding through mergers.

Lastly, aviation is markedly proactive in sustainability investments, driven by regulatory and social pressures to reduce carbon emissions. United Airlines Ventures exemplifies this trend with its extensive climate-focused portfolio, highlighting the sector’s rising pressure to commit to environmental stewardship.

Insight #8

Aviation is urgently aiming for operational excellence.

Aviation Focuses Most of Its Operational Efficiency Efforts on Core Operations

DEAL ACTIVITY (#) OF AVIATION CORPORATIONS INTO OPERATIONAL EFFICIENCY, BY FUNCTIONAL AREA, SINCE 2018

Sources: Lufthansa Innovation Hub, TNMT.com, PitchBook Data Inc.

AVIATION PRIORITIZES ITS IMMEDIATE PAIN POINTS

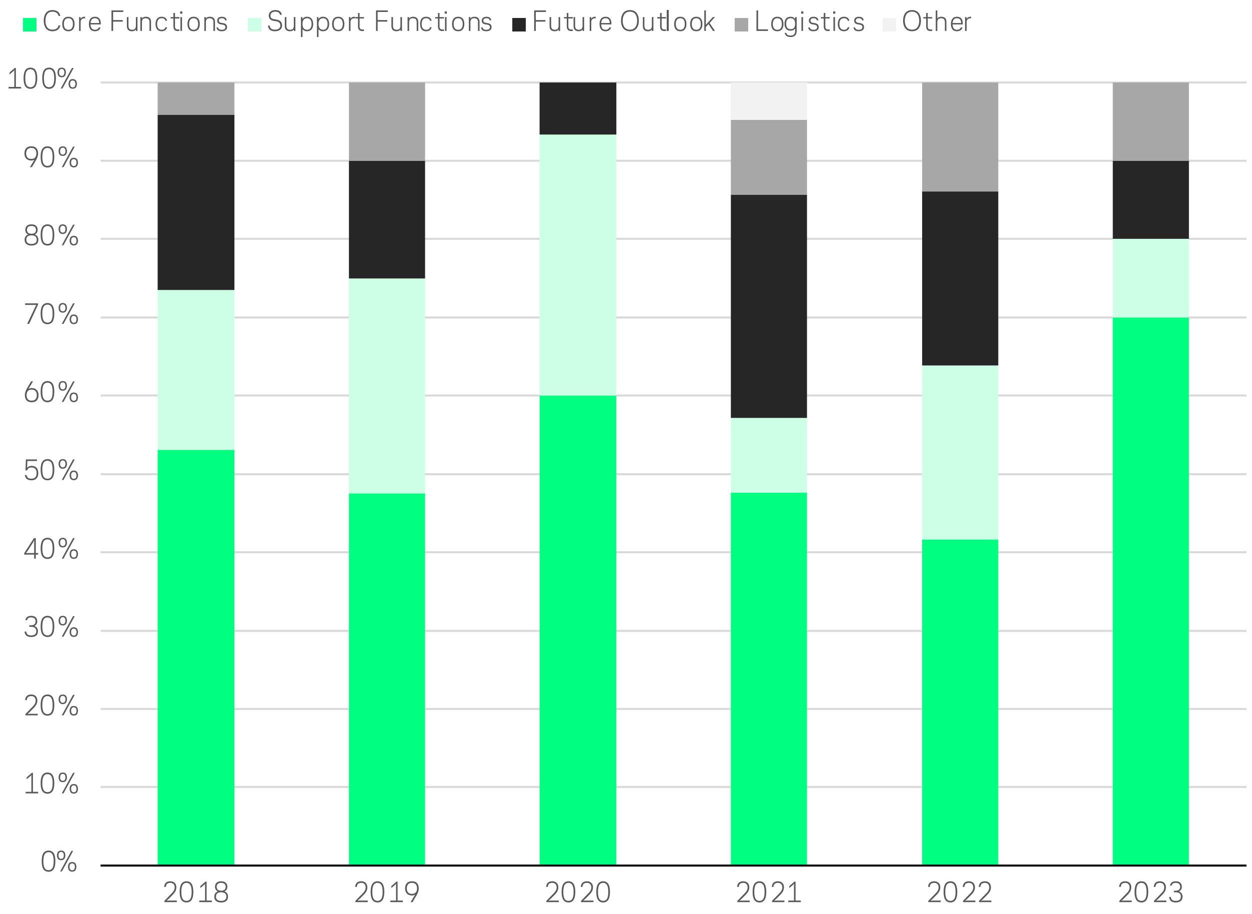
In aviation, automation is critical across the entire aircraft value chain. Aircraft manufacturers invest in advanced manufacturing techniques and materials, while airlines and airports focus on enhancing ground and flight operations, maintenance (MRO), and workforce management, including training.

This emphasis on core operational functions is a strategic necessity for the aviation industry, which operates on tight margins and faces high costs from operational disruptions. Stringent security regulations for the manufacturing, maintenance, and operation of aircraft add complexity, and flight delays can result in significant financial losses. Aviation research regularly highlights airline operations as a major contributor to delays, second only to the knock-on effects from previous delays. Issues typically stem from ramp handling, passenger boarding, and staff shortages. Investments are therefore heavily channeled into these critical operational areas to mitigate risks and reduce costs.

Support functions receive less attention, as do investments in futuristic technologies like unmanned flight, for example. This signals a focused strategy on addressing current challenges rather than exploring new frontiers.

Investments into Core Operational Aviation Functions Reach New Record High

DEAL ACTIVITY (#) OF AVIATION CORPORATIONS INTO OPERATIONAL EFFICIENCY, BY FUNCTIONAL AREA, ANNUALLY



Sources: Lufthansa Innovation Hub, TNMT.com, PitchBook Data Inc.

CORE OPERATIONS WITH MAJOR MOMENTUM

In 2023, the aviation sector reached a notable milestone by allocating the highest share of its operational efficiency investments—70%—into Core Functions, marking a significant increase from 42% in 2022.

This surge underscores a critical focus within the industry: addressing pressing operational challenges that directly impact the bottom line. Labor costs, for instance, account for approximately 30% of airline expenses and are further complicated by an ongoing labor shortage. While staffing issues among pilots and crew are problematic, shortages in ground, airport, and MRO staff are particularly acute. Consequently, leveraging technology and automation to alleviate these shortages is not just beneficial; it's essential. Investments in technology to enhance core operations are thus not merely tactical but strategic imperatives. They serve to mitigate risks associated with labor shortages and other operational inefficiencies that can lead to costly delays and disruptions.

As such, we anticipate that the focus on mastering core operations through strategic investments in promising technologies and automation will persist as a dominant theme within the sector going forward.

The Operational Efficiency Leaderboard in Aviation

Top tech investments by the aviation sector since 2022 (ranked by total funding raised of each startup)

Core Functions		Key Investors	Total Raised
1	tomorrow.io Weather Intelligence Platform	Jetblue Ventures	$333M
2	Red 6 Augmented Reality Pilot Training	AEI HorizonX	$110M
3	SHIFT5 Predictive Maintenance and Cybersecurity	AEI HorizonX, JetBlue Ventures	$106M
4	Welcome to the Jungle Job Search Platform	Aéroports de Paris	$102M
5	DUST IDENTITY Track Aircraft Part Pedigree and Provenance	Airbus Ventures	$52M

Support Functions		Key Investors	Total Raised
1	sparkcognition Enterprise AI solution	AEI HorizonX	$341M
2	JIKO Cash Optimization	Airbus Ventures	$96M
3	SECOND FRONT Software Accreditation for Defense	AEI HorizonX	$80M
4	nlx Multimodal Conversation Platform	JetBlue Airways and Ventures; Plug and Play Tech Center	$26M
5	volantio Post-Booking Revenue Optimization	Alaska Air, Amadeus Ventures, IAG, JetBlue Ventures	$10M

Future Outlook		Key Investors	Total Raised
1	QUANTUM SYSTEMS Drones for Aerial Intelligence	Airbus Ventures	$128M
2	Q-CTRL Quantum Computing Infrastructure Software	Airbus Ventures	$69M
3	FORTEM TECHNOLOGIES Counter-Unmanned Aircraft System	AEI HorizonX, Hanwha Aerospace Company	$51M
4	NEAR EARTH AUTONOMY Technology For Unmanned Aircraft	AEI HorizonX	$18M
5	Qunnect Scalable Quantum Networks	Airbus Ventures	$11M

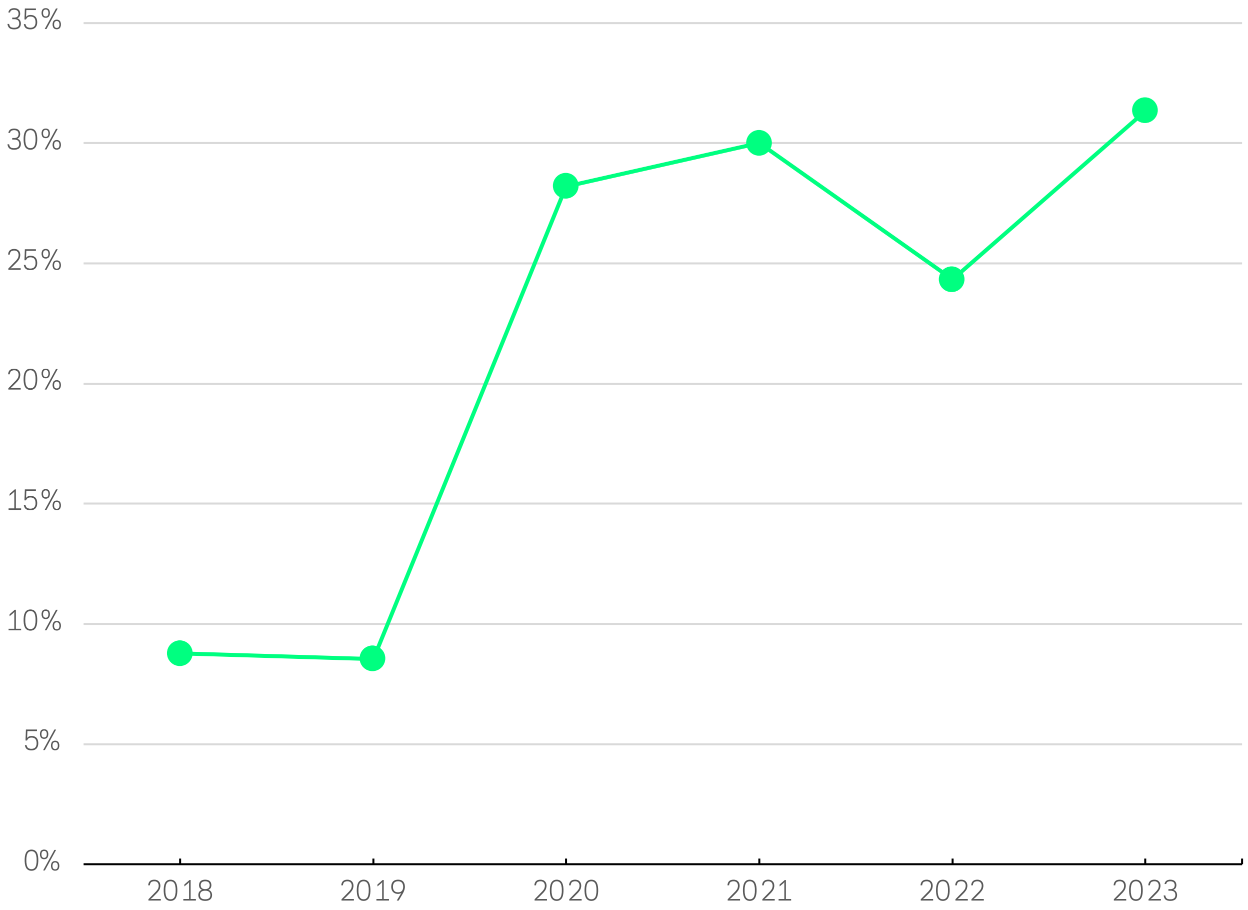
Sources: Lufthansa Innovation Hub, TNMT.com, PitchBook Data Inc.

Insight #9

Aviation’s true sustainability focus has yet to be determined.

Aviation's Rising Investment Focus on Sustainability Looks Promising

SHARE OF DEAL ACTIVITY (#) BY AVIATION CORPORATIONS INTO SUSTAINABILITY



Sources: Lufthansa Innovation Hub, TNMT.com, PitchBook Data Inc.

AVIATION'S SUSTAINABILITY INVESTMENTS ON THE RISE

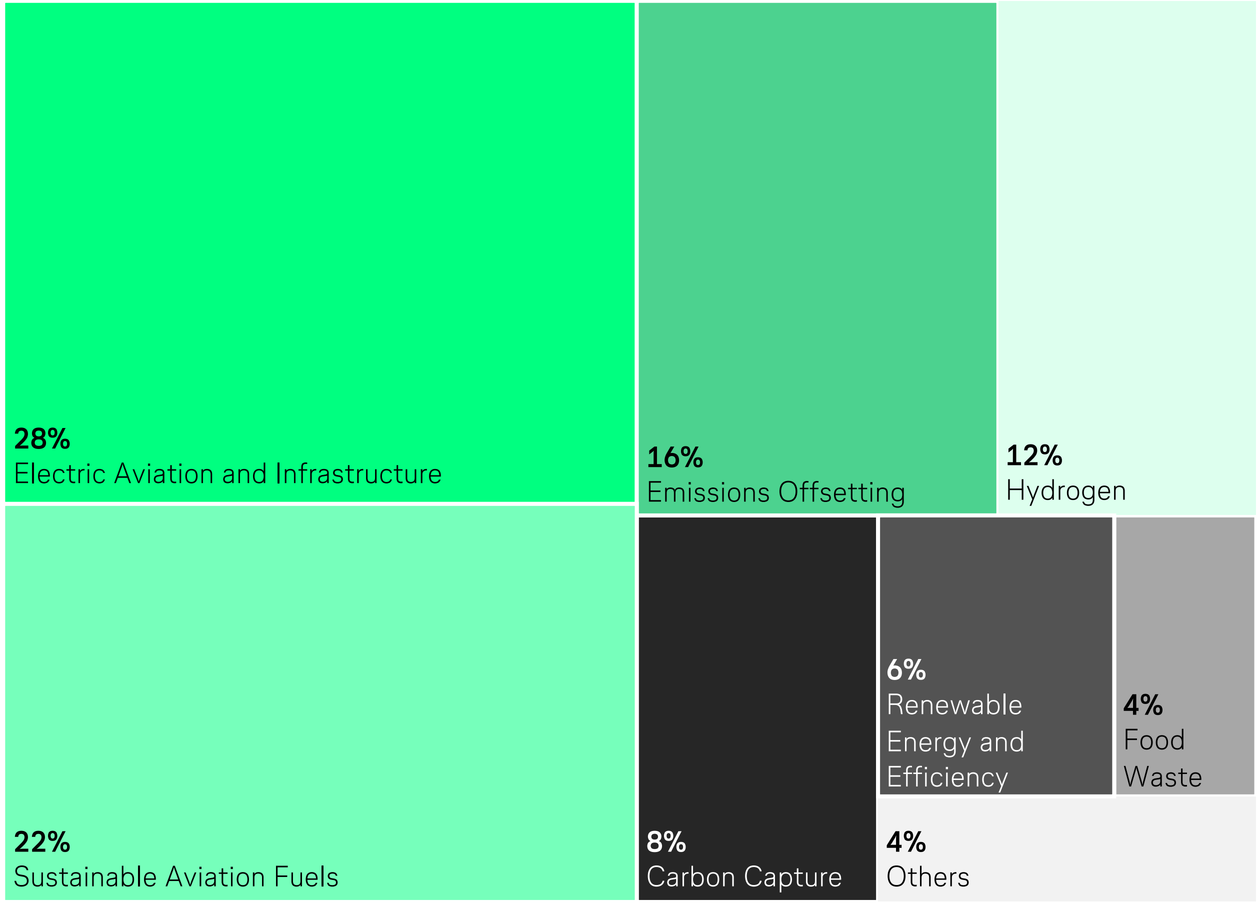
As of 2023, sustainability investments account for over 30% of all investment deals by aviation entities, a figure that has more than tripled since 2019. This significant increase is a direct response to the urgent need for aviation to decarbonize, especially given that aviation's total CO_2 emissions continue to rise while most other industry sectors in the Western world are reducing their carbon footprint.

Consequently, regulatory bodies worldwide, particularly in Europe, are enforcing stricter sustainability guidelines. For example, the Refuel EU aviation initiative compels fuel suppliers to enhance their sustainable aviation fuel offerings and mandates new data collection and reporting requirements for both fuel suppliers and aircraft operators.

Fortunately, many airlines are making firm commitments to reduce emissions, as highlighted by the International Air Transport Association (IATA) member airlines' 2021 resolution to achieve net-zero carbon emissions by 2050. With such commitments and regulatory pressures mounting, it's crucial to examine whether these investments by aviation companies represent substantial actions towards sustainability or merely symbolic gestures.

The Aviation Sector Channels Most Innovation Dollars into Three Key Sustainability Areas

DEAL ACTIVITY (#) OF AVIATION CORPORATIONS INTO SUSTAINABILITY, BY FUNCTIONAL AREA, SINCE 2018



Sources: Lufthansa Innovation Hub, TNMT.com, PitchBook Data Inc.

AVIATION'S DOMINANT SUSTAINABILITY TRIO

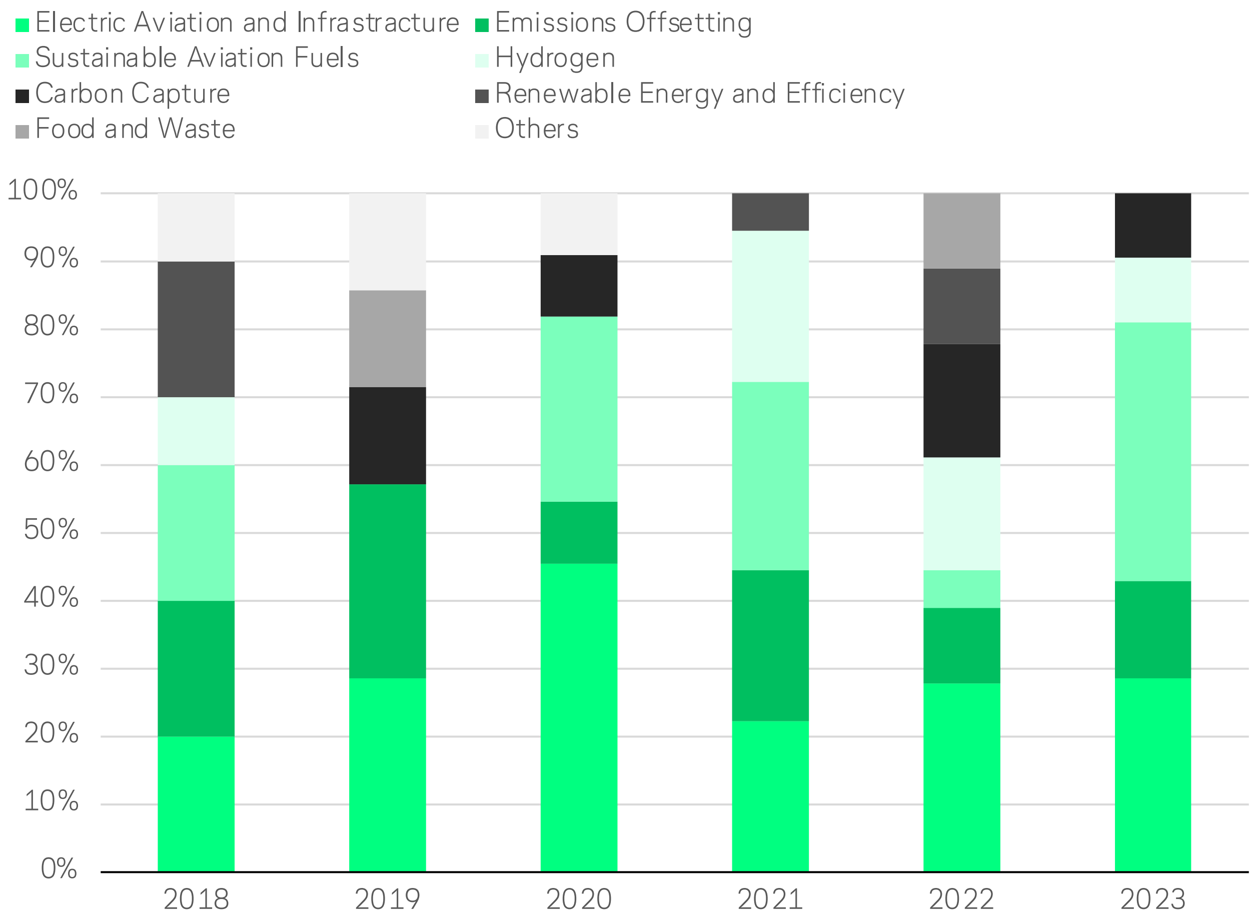
Since 2018, the majority of sustainability investments in the aviation sector have targeted three main areas: electric aviation, sustainable aviation fuels (SAF), and emissions monitoring and offsetting, together accounting for nearly 70% of all sustainability-related deals. The substantial investments in electric aviation reflect the sector's maturation, especially highlighted by several eVTOL companies approaching commercial operations — more on air taxis on the next page.

SAF has become another pivotal area, favored for its compatibility with existing aircraft engines and lower emissions production process, making it a practical yet sustainable alternative to traditional fuels. It is widely regarded by experts as the most feasible solution for significantly reducing the aviation industry's carbon footprint.

Lastly, investments in emissions monitoring and offsetting technologies have increased. These digital tools help organizations track and manage carbon emissions throughout product lifecycles and facilitate offsetting efforts through initiatives like reforestation and carbon credit trading. Such technologies are often initial steps toward broader sustainability practices and have gained traction across multiple industries.

The Ambiguities of Electric Flying For the Future of the Aviation Sector

DEAL ACTIVITY (#) OF AVIATION CORPORATIONS INTO SUSTAINABILITY, BY FUNCTIONAL AREA, ANNUALLY



Sources: Lufthansa Innovation Hub, TNMT.com, PitchBook Data Inc.

THE UNCLEAR IMPACT OF AVIATION'S SHIFT TO ELECTRIC

While the aviation sector's growing emphasis on sustainability is commendable, its focus on electric aviation, particularly on eVTOL (electric Vertical Take-Off and Landing) aircraft included in the Electric Aviation category, raises some concerns. Electric aircraft designed for regional travel, capable of carrying 9-90 passengers, could potentially reduce CO2 emissions by up to 90% compared to conventional aircraft.

However, the environmental benefits of eVTOLs, which are primarily designed for short-range urban or intercity trips and typically seat 4-6 passengers, remain ambiguous. eVTOLs are unlikely to replace conventional aircraft but could instead compete with ground transportation. Yet, their ability to reduce CO2 emissions compared to cars, especially future electric cars, is highly questionable. Given the considerable energy consumption required for vertical take-off and landing, eVTOLs demand more electric power and larger battery capacities than electric cars, raising concerns about their efficiency and real environmental impact—a sentiment that is shared by many aviation think tanks including Bauhaus Luftfahrt.

Thus, the aviation industry's focus on electric aviation and air taxis warrants closer scrutiny.

The end.

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