



**Deep Diving into  
Travel Behavior with  
Data, Analytics, and AI**

**PLUGANDPLAY**



## We connect the best technology startups and the world's largest corporations.

### We help you in every step of your innovation journey

Partnering with the largest organizations worldwide gives us a line of sight to identify the main pain points affecting each industry. We then focus on sourcing the best startups that can provide the best solutions to these challenges.

By collaborating with startups, corporations increase operational efficiencies, decrease costs, find new product lines, and become more innovative from the core.

**450+**

Corporate Partners

**50+**

Offices Worldwide

**50,000+**

Carefully curated international startups in our network

**\$12bn**

Plug and Play's startup community has raised \$12bn in venture funding

## Global Reach

One of our greatest ambitions is to make our ecosystem accessible wherever you are. With offices across the world, we're proud to be the world's largest innovation platform by geographic reach.





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# Introduction

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Undoubtedly, Covid-19 has significantly challenged the entire travel and hospitality industry. Frequently changing governmental restrictions forcing airlines, hotels, and other providers to fully stop operations or provide only certain parts of the usual services, combined with closing borders and often rather intransparent and constantly modifying entry requirements; traveling became an experience of frustration, uncertainty, and required lots of preparation and flexibility.

Times of crisis and uncertainties urge us to take a step back and review the current processes and procedures affected by the situation. It is, therefore, relevant to recall “危机,” the Chinese word for “crisis,” which is composed of two parts; “danger” and “opportunity.” Without danger, the opportunity cannot arise; that has been particularly true with the pandemic.

Historically, it has been in times of crisis that innovators have emerged creative to solve problems. Priceline, for example, survived the post-dotcom bubble and the post-9/11 period by merging Active Hotels and Bookings, creating Booking.com, a brand that completely changed online travel. Also, sharing economy with companies like Airbnb emerged out of the 2009 financial crisis as a response to people looking for additional sources of income. Dynamics in these market conditions set the stage for disruption and new business opportunities.

This ebook deals with how to keep up with the pace of managing travelers' expectations. The starting point is discovering passengers' true pain points throughout the travel journey. We will introduce two of our startups from Program 3 at Plug and Play Vienna to shed light on this topic. They will suggest their views on why analyzing the right data allows us to understand the needs of customers and create a competitive advantage for travel companies.

**Maya Wagner**

*Plug and Play Austria*





# Predicting travel demands



## What corporations see

### NextGen travel demand forecasting

It's neither news nor a secret how important it is to keep track of demand for companies operating in and adjacent to the travel and hospitality industry. Clear industry and academic evidence show the quantified effect of accurate demand forecasting on revenue management. Companies leveraging high-quality data should see double-digit revenue uplift potential.

This is true across a wide variety of vertical travel fields. Dynamic network optimization can lead to significant benefits for airlines, reaching full airport management maturity, optimization of advertising conversion rates for OTAs, enabling fare predictions, or strengthening supplier relations and resource planning for travel management companies.

Although, for many years, companies in the travel industry have resorted to historical internal transactions for insights on future demand, most are now realizing this practice has become obsolete and subject to significant improvements. It is shifting from an exclusively internal focus on constrained bookings to a holistic view that includes total market demand and external factors that impact travel demand. The approach to accuracy and reliability of forecasts has also changed, moving to advanced embedded accuracy and reliability instead of oversimplified one-dimensional accuracy metrics; this makes forecasts more accurate and very transparent on the exact reliability at each point in time, including quantified deviations expected.

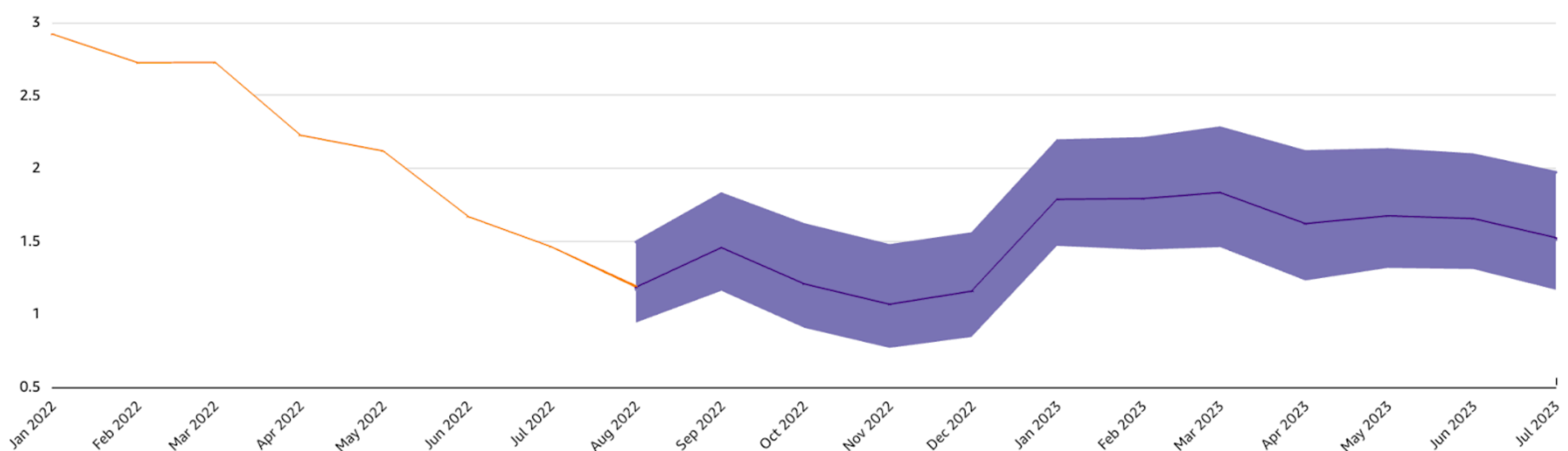




Forecasts that take into account a wide range of leading driving factors play a critical role in modern technology product management - delivering great products and services across the industry. To enable this, a wide range of factors should be considered, such as competitive behavior, market dynamics, consumer intent, macroeconomics, disruptions, and pandemics. This makes it critical to keep track of past, composite demand across the latter factors and incorporate these seemingly unrelated disparate variables. New technologies leveraging granular, scalable multivariate analyses and machine learning, previously only available to a limited set of other industries, are now ready to be used by travel industry teams.

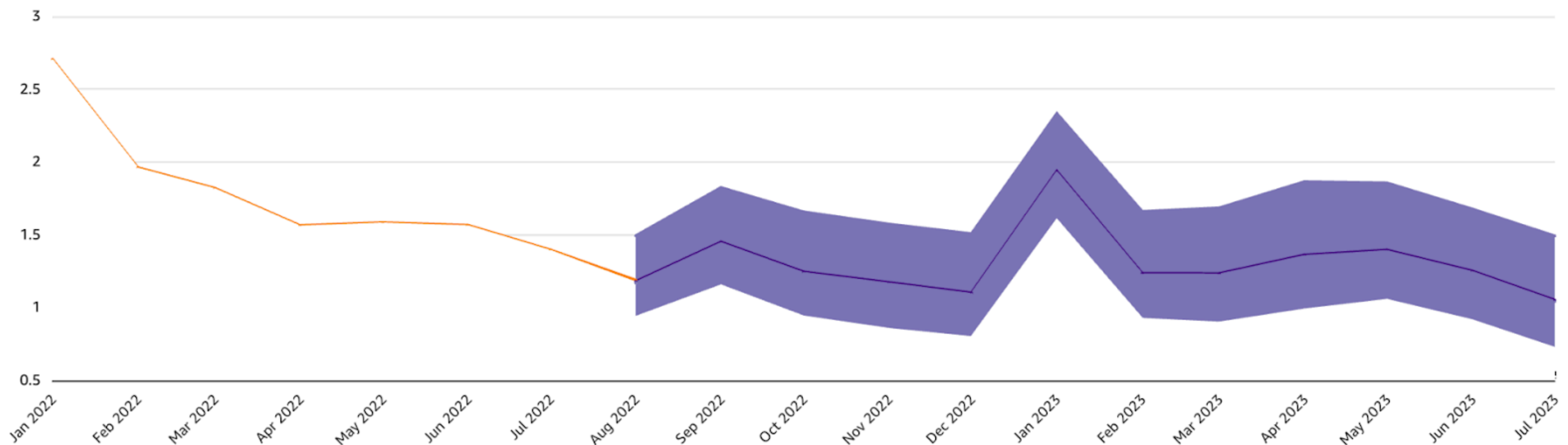
Another major disruption in forecasting is moving away from focusing on accuracy and reliability as single objects. Instead, more focus is given to a comprehensive array of prediction accuracy and reliability metrics that provides a whole new set of metadata insights. These insights offer richer interpretations and create more user confidence. For example, with the advanced AI-generated predictions, the dynamic probability intervals provide a robust way to know the expected reliability of a forecast at a specific point in time, in contrast to performance and error metrics that generalize over an entire period.

This is illustrated in the below samples, where the contextual top-of-funnel demand is predicted for air travel, expressed in the growth rate. The specific origin-destination pairs have been masked and replaced by their respective regions in this sample. This is generated through a fully-automated machine learning prediction platform. It captures and processes the various independent signals and uses those to adjust itself while continuously applying resampling methods to augment accuracy and reliability.

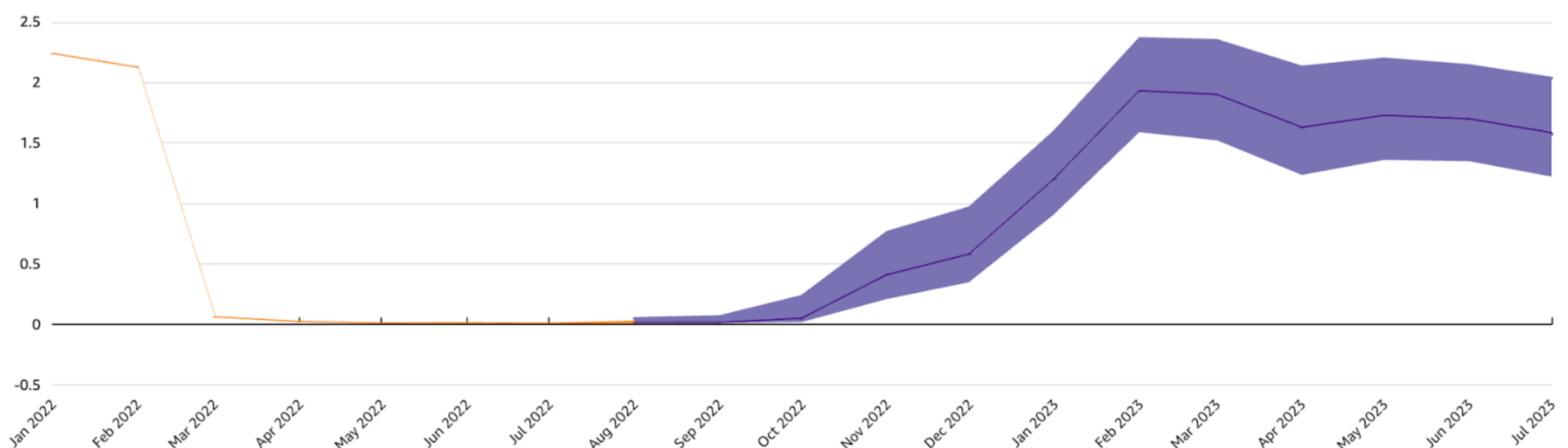


Travel Demand - Europe to Europe (Predictions in purple)





Travel Demand - Europe to the U.S. (Predictions in purple)



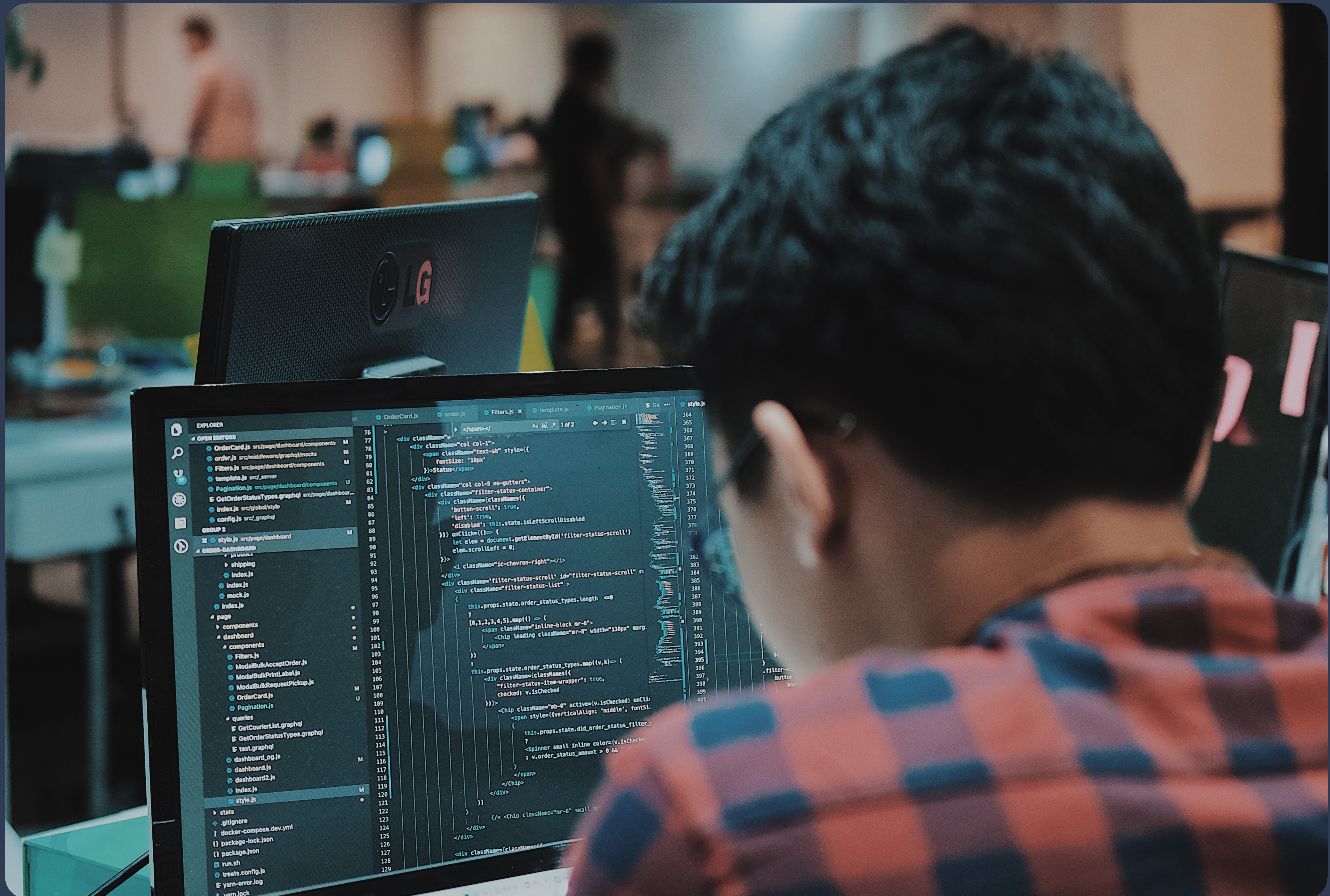
Travel Demand - War affected the international market (Predictions in purple)

The latter sample pertains to an international market affected by the war in Ukraine. It indicates early signs of slight recovery starting in Q4 2022, with recovery picking up by the end of the year and into Q1 2023. While the future is volatile in areas impacted by the war, the current early demand signals suggest improvements early next year.

ZYTLYN works on the cutting edge of new and disruptive predictive analytics technology. It focuses on the travel and hospitality industries, feeding predictive intelligence to some of the world's biggest airlines, airports, and travel agencies.

If you believe ZYTLYN can help with its predictive travel intelligence product, contact it at [hello@zytlyn.com](mailto:hello@zytlyn.com) for a demo or trial.





“Predictive intelligence is a much-needed capability with significant benefits in companies’ commercial, financial, and operations across travel. Yet it's lightweight and backward compatible to existing systems, making it easy to adopt and use.”



**Houman Goudarzi, Co-Founder & CEO of ZYTLYN Technologies**



# Managing travelers' expectations

## What travelers say is important

### The online perception of air travel in the DACH region since 2020

To assess the changing travel trends and expectations before, during, and after the pandemic, we have collected all air travel-related public content from the German, Austrian, and Swiss webs from the beginning of 2020 until July 2022. This was done via Neticle Media Intelligence, an intelligent social listening tool with automatic text analysis.

The first glance at the data reveals that quarantines had a strong effect in 2020: there were twice as many mentions of air travel in 2021 than in 2020 on the German and Swiss webs, and there was a significant increase on the Austrian web as well. There was more increase in 2022, especially in the last three months of the examined period.







The number of mentions of air travel in the DACH region per month, with the percentage of negative/positive toned mentions

The sentiment analysis shows that the overall mentions of air travel were more negative than positive, especially in Germany and other countries. However, when we look at the details (see the table above), it becomes visible that the amount of negativity and positivity has followed the waves of the pandemic quite well. So, after the shock of the COVID-19 outbreak, the summer months in 2020 had a better mood, as well as early autumn, but then the sadness returned as the second wave hit. Towards the end of 2021, the trend started to change slightly, and some positive months happened. 2022 started positively, but June and July have gone far off in the negative direction again.



## How about a holiday in the risk zone?

In the first two months of 2020, even though that's before the epidemic became a pandemic, "China" was already the number one country in the mentions because much of the conversation in January and February revolved around several airlines stopping all flights to China. However, "holiday" ('Urlaub') was still the number one topic in these two months. "Coronavirus" was the second most important topic behind that, but it quickly rose to first place in March. Next, in March and April, "Iran" was the most often mentioned location because it also became a high-risk country. Air travel to and from there was stopped as well. Then in the following months, news came from various airports, showing parked airplanes and reporting about limited flights – these were the most prominent news instead of destinations.

While "Coronavirus" replaced "holidays" on the list of key topics, another new topic, "cancellation" ('Stornierung'), also appeared. Another significant change was that "Urlaub"/"holiday" became a negative topic everywhere – people couldn't travel for leisure. Then, in May and June, after the first wave, "Urlaub" took first place again and became a positive topic throughout the summer.





Even though people were talking about holidays again after the first wave, it just wasn't that easy: cancellation was still at 11th place among key topics. Moreover, another new expression reared its ugly head in the summer months, collecting thousands of mentions: risk zone ('Risikogebiet'). The world became divided into (somewhat) safe and unsafe zones, and enthusiastic flyers were trying to determine which places they could still visit without issues.

The next phase starts at the end of 2020, when vaccination first became available. It immediately became a key topic in air travel-related online conversations as well. However, this was also the start of the second wave of the pandemic. So, from 2021, key topics included masks, tests, and quarantine. Holidays became a negative-toned topic again throughout the first four months of 2021 but got a positive predominance from the summer onwards.



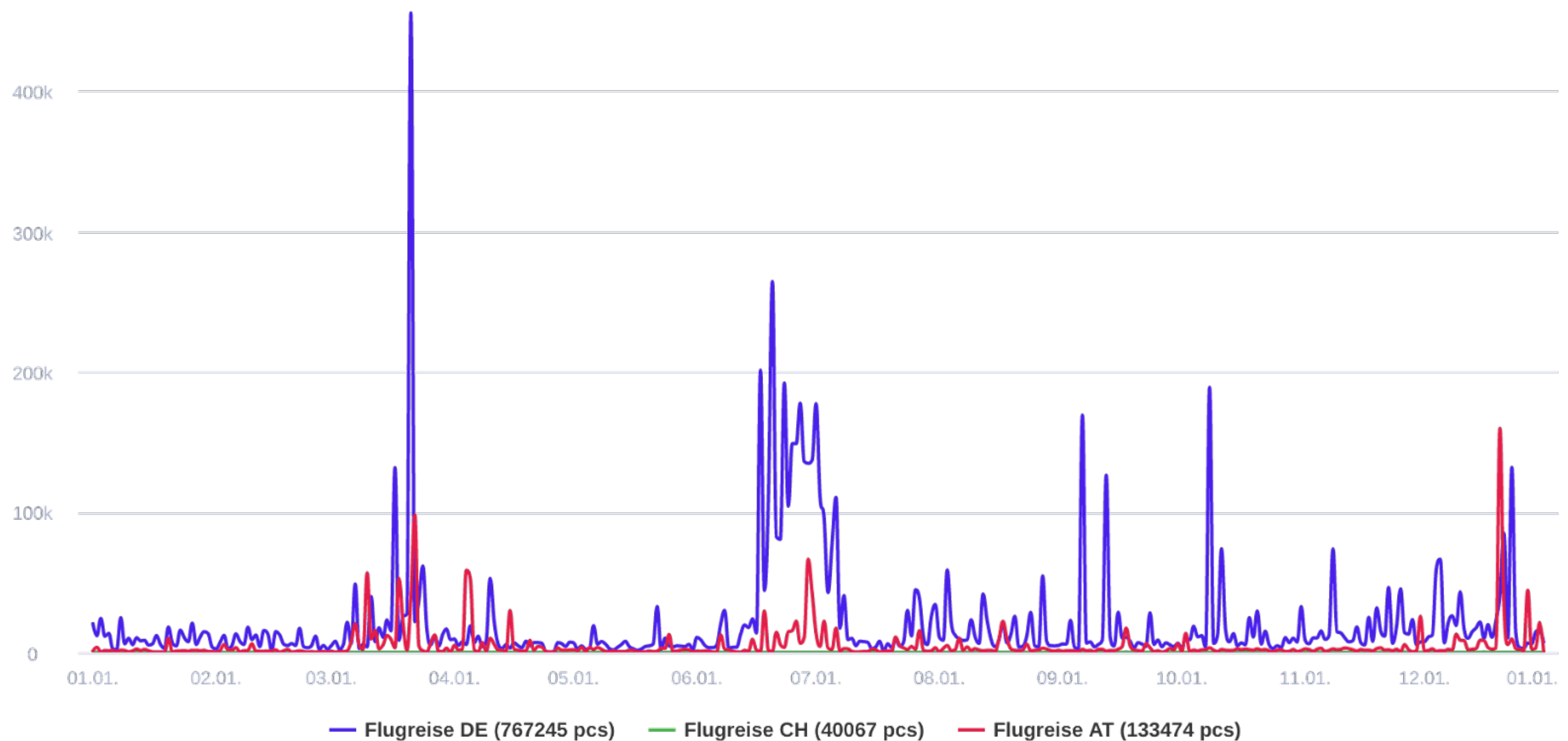
### **Business-related travel**

Throughout the analyzed period, traveling for business always had fewer mentions than traveling for holidays (which was always among the top three topics). It also had fewer hits during 2021 - especially the first half of the year - than before or after. Though attitudes towards business travel did not seem to fluctuate as much as those towards holidays: business travel had slightly more positive mentions than negative ones throughout, just much fewer overall. In 2022, however, it seemed to return with higher mention numbers and placed second on the list of key topics between January and April.



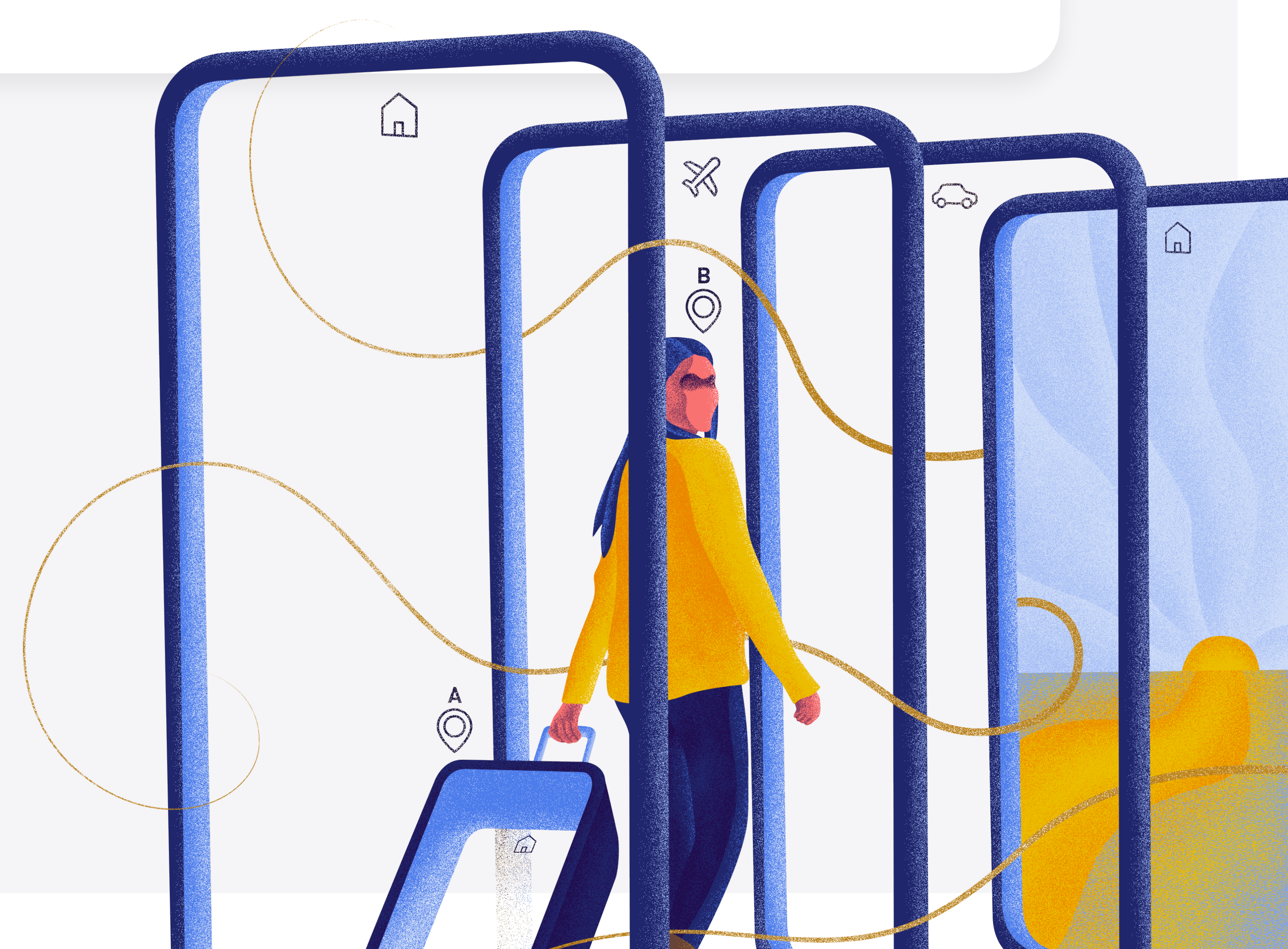
**Engaging content: what got people clicking and sharing?**

Another thing that followed the COVID-19 waves quite well was the level of engagement people had with air travel-related content. Basically, when they were not allowed to travel, posts related to this topic gathered much fewer interactions.



*The number of interactions with air travel content in 2020*

In 2020, the top 10 most engaging posts in Germany either came from before, from the start of the pandemic, or towards the end of the year. All highly engaging posts in Austria were connected to the pandemic. In Switzerland, engagement generally remained low in comparison, as the chart shows as well.





The outbreak of interactions in March was likely due to airlines being heavily featured in the news because of their loss of income, but people took to Twitter to express their discontent with the "bailouts" airlines were receiving with taxpayer dollars.

## Popular Opinion

[@RBReich](#)

"No industry -- not airlines, not hotels, not cruise ships -- should be bailed out. They can stay in business by borrowing at rock-bottom rates, using their assets as collateral.

Taxpayer money should be used to bail out people, not corporations."

51.1k Retweets 3,359 Quote Tweets 159K Likes

[@LailaLalami](#)

"Capitalism means I get charged \$125 to cancel a \$200 ticket by an airline that's getting bailed out with my taxpayer money."

50.9K Retweets 1,933 Quote Tweets 267.2K Likes

[@KyleBae87](#)

"Airlines texting me 'we in this together' emails but when my bag was 35kg I was on my own."

47.8K Retweets 2,326 Quote Tweets 254.9K Likes

[@MelsLien](#)

"Airlines: \$35 to put your bag on our plane  
Airlines: \$16 for bag of chips  
Airlines: Sorry you want your \*legs\* to fit? \$75  
Airlines: haha, you have to fork over an extra \$50 to choose the seat you already paid for  
Airlines: Oh no someone help us we r out of monies"

138.3K Retweets 4,680 Quote Tweets 690.5K Likes





In 2021, with the increased mention numbers, there was about twice as much engagement as well, especially in the year's second half. Before that, in March and April, engagement was mainly linked to COVID-19 regulation announcements.

In May and July, sustainability appeared among the most important themes. For instance, it appeared in [a political approach](#) to cheap, short flights versus train rides (“everyone who wants to can go on holiday, but the way they do it matters”) and in tragic environment-related news of fires in the Mediterranean, where [the airport in Catania even shut down](#). At the same time, being fully vaccinated had become [enough for air travel](#); no test was needed anymore.



### **Cautiously opening up**

If we follow the most engaging content further, it really shows what kind of travel trends people were excited about. In June, it was announced that [Italy was no longer a risk zone](#). While in November, [Australia reopened its borders](#) after a very long time. A [tweet about flying to a BTS concert](#) went viral.

There was less-positive content online but with high engagement, like this one popular in Switzerland about people not wearing masks flying or the Omicron variant arriving in Germany, resulting in [suspended air traffic with South Africa](#). Nevertheless, in December, [a giveaway for a trip to Mauritius](#) got many people excited about traveling again, who tried to balance safety and reasonable prices.



### **The summer of 2022: lack of personnel, lost baggage, delays**

Unfortunately, in the past two to three months, mentions of air travel have started to follow a whole new script in every sense. The positive sentiment from the start of the year turned around completely, as the ratio of negative-toned mentions was up to 10% higher than that of positive ones.

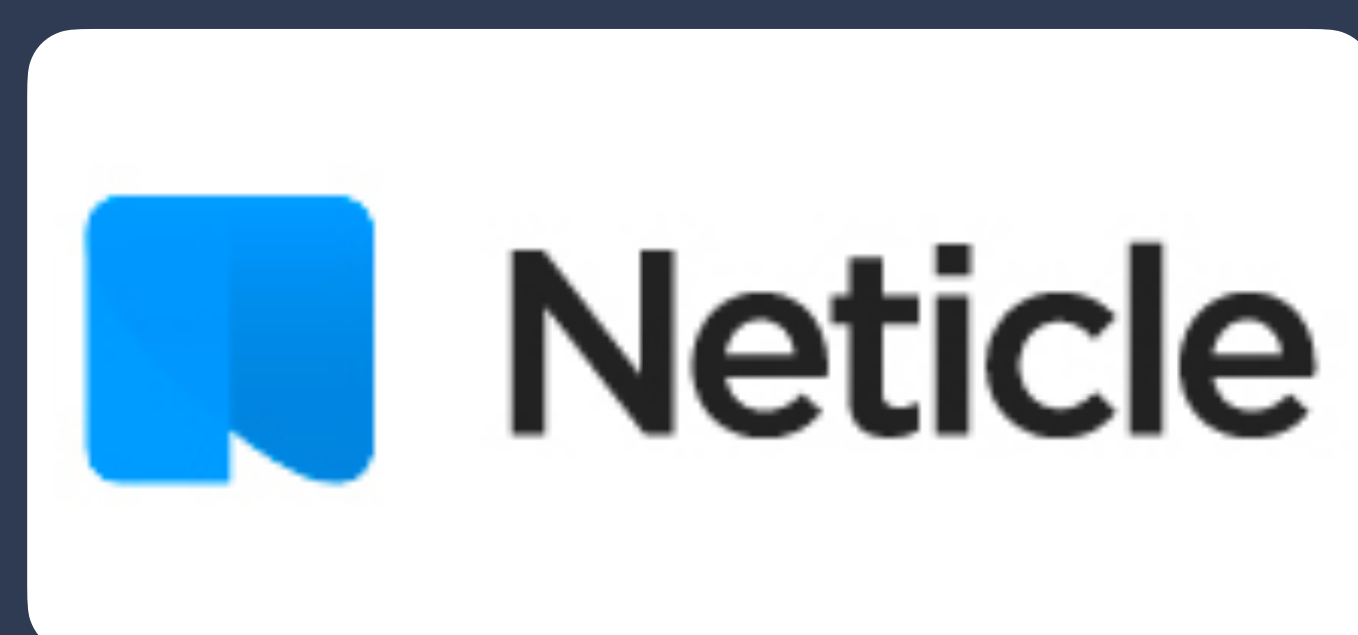
The topic of business trips mostly disappeared from the top list. While holidays were still number one, people mostly weren't talking about them in a happy way. This was because airlines had been struggling with a severe lack of personnel now that passengers had returned to airports and wanted to fly again. Too many people were laid off during the pandemic-stricken months, and the result of that now was delayed flights, passengers waiting in vain at baggage claim, unresolved complaints, and so on. This is what the online conversation is revolving around currently, and it's up to airlines to wrap up this chapter and fix the service provided by hiring more people as soon as possible.



[Neticle](#) is one of the fastest-growing B2B SaaS startups in Hungary, providing text analytics solutions for enterprises in more than 30 countries globally. The company has four products to boost data-based business decisions: Neticle Media Intelligence, which can show companies what the web thinks of their brands and products; Zurvey.io, a customer experience data platform that can automatically analyze thousands of textual data like open-ended survey responses or product reviews. The motors of these systems are the Text Analysis API and Data API, which can be easily integrated into companies' own platforms.



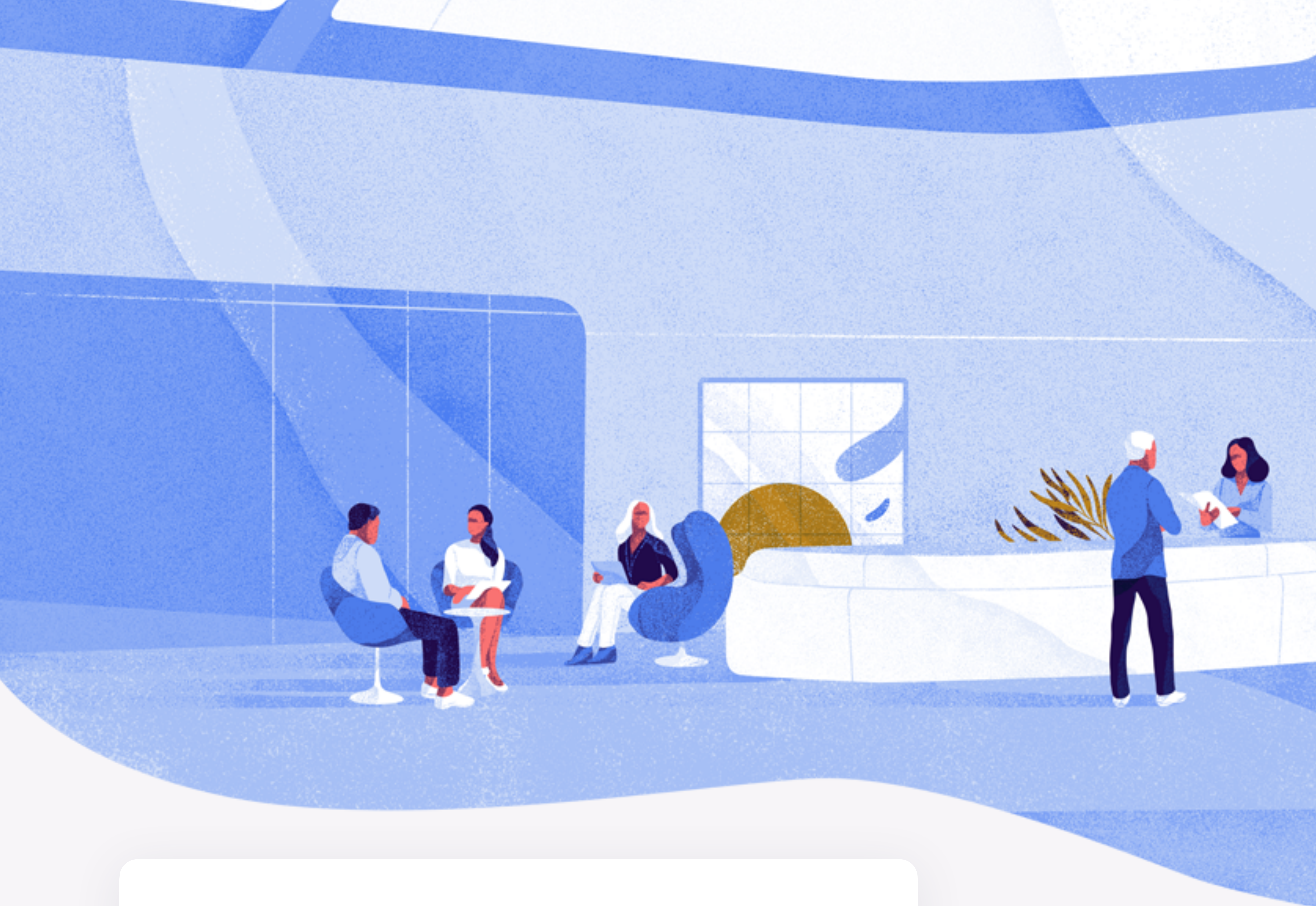
“Companies need to apply cutting-edge technology, like natural language processing, to fully understand the voice of the traveler. This opens new ways to turn unsolicited feedback into business opportunities.”



**Peter Szekeres, CEO & Co-Founder of Neticle**







Plug and Play is a global corporate innovation platform that helps connect corporate partners to startups in order to help solve their greatest challenges. We also operate as a venture fund and startup ecosystem. To date, we have helped over 5,000 early-to-growth stage startups raise over \$12 billion. Plug and Play is consistently ranked among the most active VCs in Silicon Valley.

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