

SITA

2023 BAGGAGE IT INSIGHTS



EXECUTIVE SUMMARY

In 2022, the recovery of air travel surpassed expectations, with traffic surging to 3.42 billion passengers. This is well ahead of the expectations of industry bodies and experts who were anticipating a full recovery by 2024. Despite this positive news, the swift come-back took the industry by surprise, resulting in increased disruptions and baggage mountains as airports, airlines, and ground handlers navigate the surge in traffic with reduced staff.

This year's Baggage IT Insights report highlights an exponential increase in the mishandled baggage rate by 74.7% to 7.6 bags per thousand passengers in 2022. This can be traced back in large part to the resumption of international and long-haul flights throughout 2022, meaning more transfers, where bags are most susceptible to being mishandled. To better express the scale of the challenge, mishandling rates for international flights – where bags are more likely to be transferred from one flight to another – are eight times higher than for domestic flights.

With airlines, airports, and ground handlers still facing staff and resource shortages, the industry has turned its focus to achieving more with less with the help of smart technologies. As a result, we are seeing an acceleration in digitalization, and baggage management is a crucial investment area.

In 2022, investment in self-service initiatives continued to increase, with a majority of airports and almost all airlines prioritizing touchless bag tagging options that rely on kiosks and passengers' mobile devices.

Unassisted bag drop implementations are also on the rise, with 96% of airlines and 72% of airports aiming to make touchless unassisted bag drop available by 2025. By digitalizing baggage operations, air travel can optimize baggage handling, minimize costs, and enhance the overall passenger experience.

For example, to address transfer mishandling, SITA developed the WorldTracer Auto Reflight system in direct response to the high mishandling rates observed at transfer. This solution automatically identifies bags that are not likely to make their planned connecting flight and rebooks them on the next possible flight using the existing bag tag – all while keeping the passenger informed.

SITA estimates that automation of reflight operations could save the industry up to \$30 million per year.

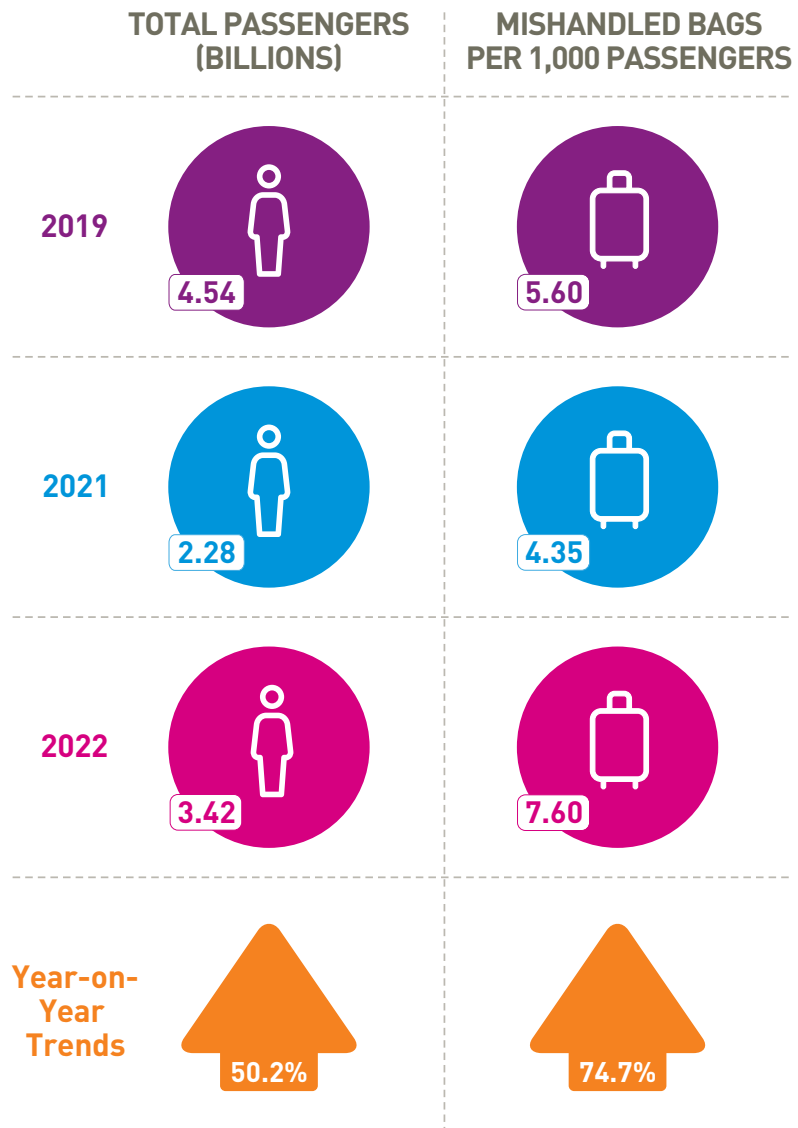
Clearly, as the industry grappled with the return of passenger traffic in 2022, baggage mishandling rates took a hit. But despite this, the sharper focus on digitalization and automation is bringing opportunities to improve operational efficiency, leading to better passenger experiences and reduced costs.

SITA is committed to working with the industry to ensure passengers are once again confident to check in their baggage.

David Lavorel, CEO, SITA



YEAR-ON-YEAR BAGGAGE MISHANDLING RATE



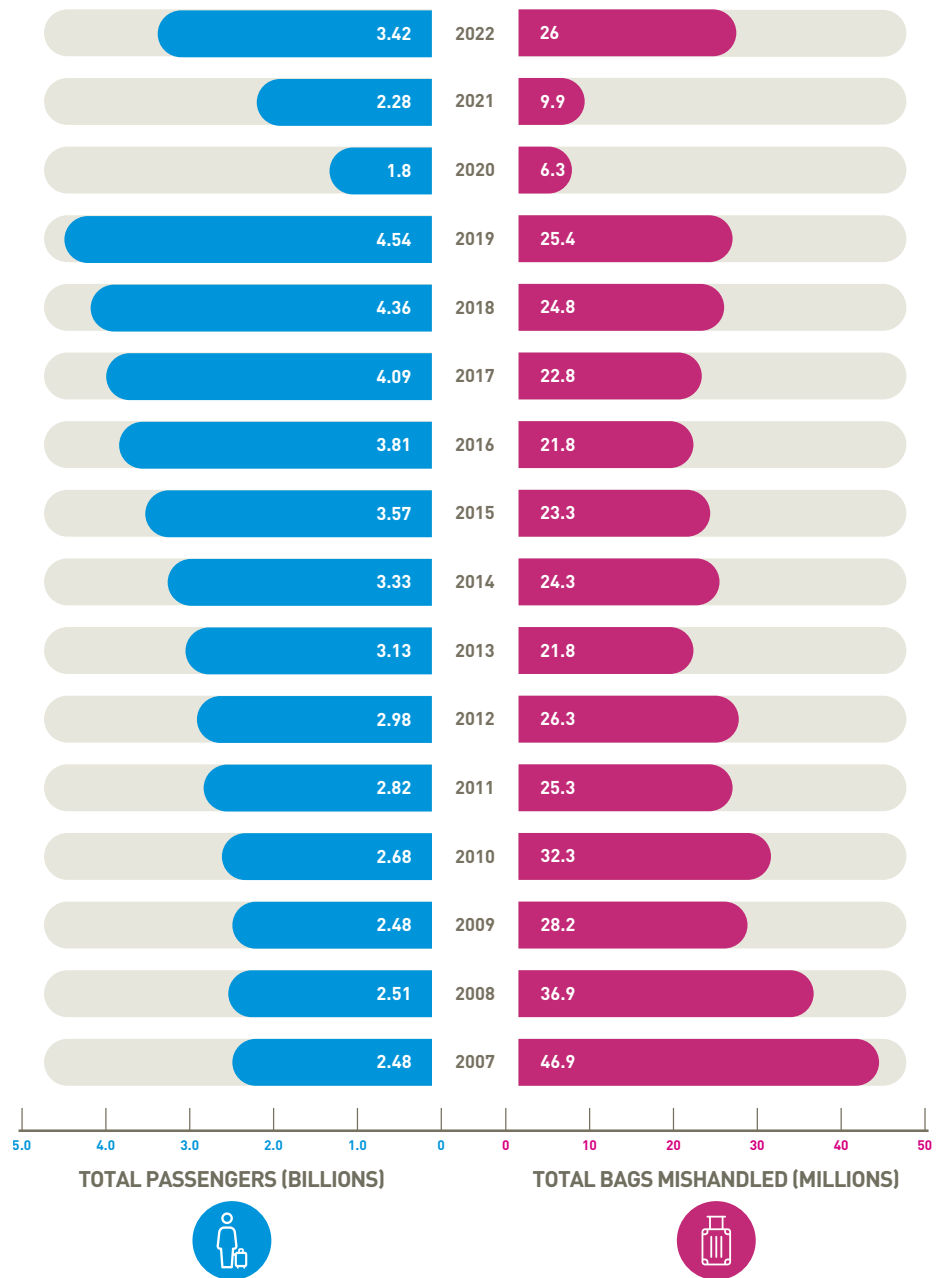
As the travel industry rebounds from the pandemic, there has been a notable increase in the number of mishandled bags. In 2022, the rate of mishandled bags almost doubled from the previous year to 7.60 bags per thousand passengers. The industry has faced many challenges due to the pandemic, including a shortage of skilled staff, making it difficult to manage bags and ensure their smooth handling at airports. This has fostered the urgent need to digitalize baggage processing further.

Consequently, the travel industry is shifting its focus to digitalization and automation. Airports are adopting more agile and resilient business models to swiftly adapt and scale their operations to handle fluctuating traffic volumes. Technology investments that deliver greater automation and self-service are a top priority. Digitalization led to a massive drop in mishandled rates between 2007 and 2019 (70%)¹, and the pandemic has only highlighted the need to further automate. As the industry continues to evolve, digital technologies and innovations will be crucial to the smooth handling of baggage and enhancing the travel experience for passengers.

¹ 2020 SITA Baggage IT Insights.



LONG-TERM DECREASE IN BAGGAGE MISHANDLING

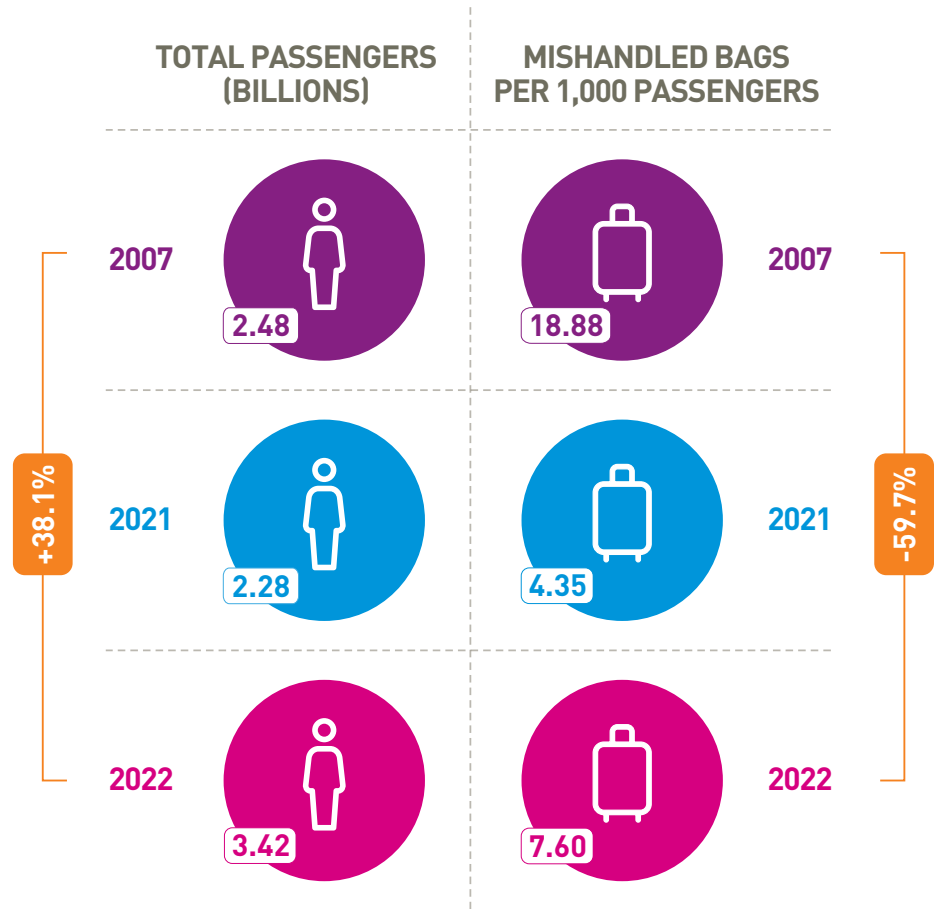


Travel has entered a new era in 2022, bringing traffic volumes close to pre-pandemic levels. A total of 3.42 billion passengers traveled during the year, resulting in the surge of mishandled bags. Although the number of mishandled bags almost doubled to 26 million bags per thousand passengers, the total number of mishandled bags, at 26 million, still represents a 59.7% reduction from the 46.9 million mishandled in 2007.

The industry anticipates air travel won't return to pre-crisis levels until 2024. Despite this, airports and airlines are investing in digitalization and automation technologies to make the journey through the airport seamless and smooth. Baggage technology investments are a key focus in this effort. With digital innovations, such as automated baggage handling and self-service kiosks, airports and airlines can manage fluctuating traffic volumes more efficiently and ensure a hassle-free baggage journey for passengers.



LONG-TERM BAGGAGE MISHANDLING RATE



2022 marked a turning point for the air travel industry as passenger traffic returned across the world. The 3.42 billion figure for total passengers represent a 38.1% upsurge from the figures of 2007 and a 50.2% increase on the 2.28 billion in 2021.

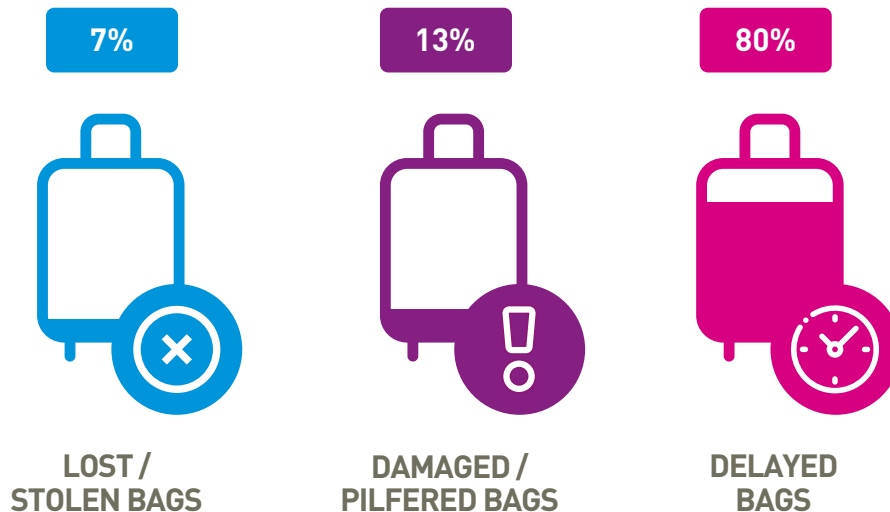
With the gradual resurgence of air travel and mounting passenger traffic, the challenges of ensuring timely baggage delivery to the aircraft have intensified. The 2022 mishandling rate of 7.6 bags per thousand passengers is a 75% increase from 2021. However, the long-term trend is still a significant decrease in mishandling, with the rate per thousand passengers decreasing by 59.7% from 2007 to 2022.

The 2021-2022 experience is a temporary aberration that strongly suggests further action is needed on the digitalization of baggage management.

The significant reduction in mishandling rates over the past decade and a half demonstrates the industry's commitment instead improving baggage handling, ensuring passengers a more seamless travel experience.



BREAKDOWN OF MISHANDLED BAGS



% represent reasons for mishandling of the total mishandled bags

Recent data reveals that delayed bags accounted for 80% of all mishandled bags in 2022, a 9% increase compared to the previous year. The percentage of lost and stolen bags increased to 7%, while damaged and pilfered bags decreased to 13% (a 10% drop from 2021).

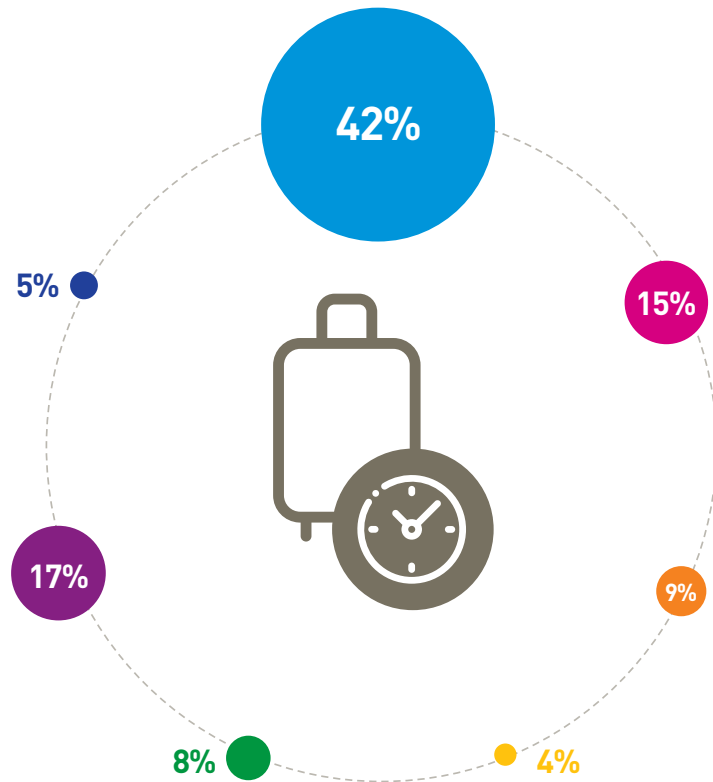
To address this issue, investing in real-time baggage status information has become a key priority for airlines. Currently, 57% of airlines provide their staff with mobile access to real-time baggage status information, and this figure is expected to increase significantly to 84% by 2025. Furthermore, by 2025, 67% of airlines plan to offer real-time baggage status information directly to passengers, marking a substantial improvement from 25% today.²

These investments in technology will enable airlines to manage baggage handling better and reduce incidents of mishandled baggage, leading to enhanced customer satisfaction and an improved brand image. By providing staff access to real-time information, airlines can quickly identify and address any issues, resulting in improved efficiency and reduced costs. Additionally, direct access to baggage status information for passengers will lead to a more streamlined and stress-free travel experience, further improving customer satisfaction.

² Air Transport IT Insights 2023.



TRANSFER MISHANDLING & LOADING ERRORS ARE THE TOP REASONS FOR DELAYED BAGS



% represent reasons for mishandling of the total mishandled bags

- | | |
|---|--|
| ● TRANSFER MISHANDLING | ● AIRPORT / CUSTOMS / WEATHER / SPACE-WEIGHT RESTRICTION |
| ● TICKETING ERROR / BAG SWITCH / SECURITY / OTHER | ● FAILURE TO LOAD |
| ● LOADING ERROR | ● TAGGING ERROR |
| ● ARRIVAL MISHANDLING | |

Transfer bags have historically accounted for the majority of mishandled bags in the air travel industry. This trend continued in 2022, with a 1% increase from 2021, pushing the proportion of bags delayed at transfer to 42%. This increase can be attributed to the rise in long-haul flights during the year.

However, there has been a decrease in other types of mishandling incidents. The failure to load bags accounted for 18% of all mishandled bags in 2022, representing a 3% decrease from the previous year. Ticketing errors, bag switches, security-related incidents, and other miscellaneous factors also decreased by 3%, accounting for 15% of all mishandled bags. Delayed bags - due to airport, customs, weather, or space-weight restrictions - remained consistent with the previous year at 8%.

In terms of specific reasons for delayed bags, loading errors more than doubled compared to last year, accounting for 9% of all delayed bags in 2022, an increase that most likely stemmed from operations strains on baggage systems. On the other hand, arrival mishandling and tagging errors saw a 1% decrease compared to 2022.

These trends in mishandling incidents highlight the need for continued investment in technology and infrastructure to ensure efficient and accurate handling of baggage, ultimately improving customer satisfaction and the overall reputation of airlines.

**All the changes in % represent an increase/decrease in percentage points.*



GLOBAL MISHANDLING RATES FOR DOMESTIC & INTERNATIONAL FLIGHTS

MISHANDLED BAGS PER 1,000 PASSENGERS GLOBALLY



GLOBAL



2.4



19.3

DOMESTIC

INTERNATIONAL

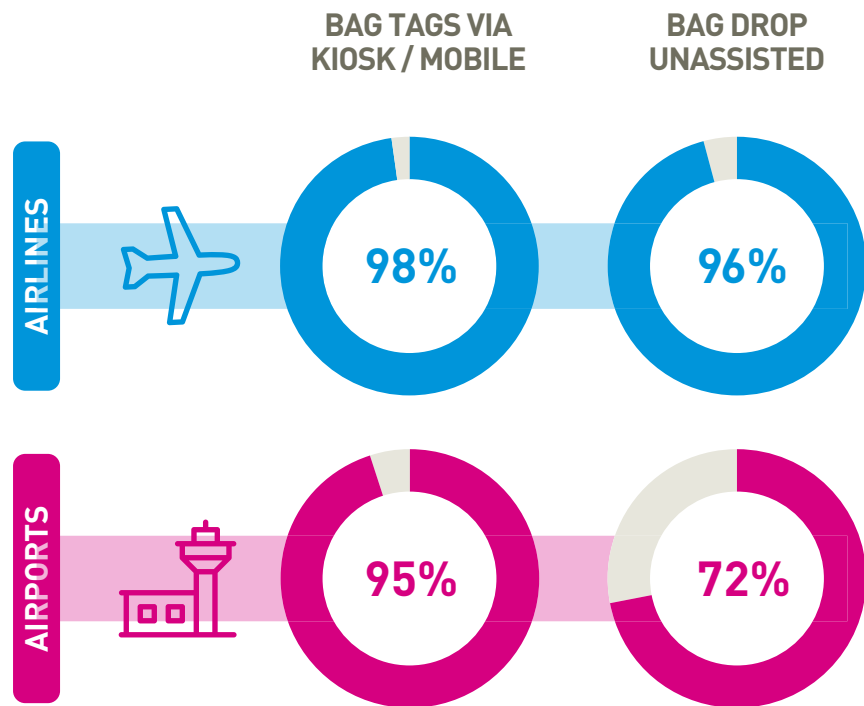
It is important to highlight that the mishandling rates on international routes are significantly higher compared to domestic routes. In 2022, there was a considerable surge in the international mishandling rate, which more than doubled compared to the previous year.

At the global level, the mishandling rate for international routes is 19.3, while for domestic routes, it is only 2.4. This means the likelihood of mishandling a bag on international routes is about 8 times higher than on domestic routes. This increase can be attributed to the rise in long-haul flights, and other factors such as airport congestion, customs procedures, staff shortages, and language barriers.

These statistics underscore the importance of investing in technology and infrastructure to improve the baggage handling, particularly on international routes. By doing so, airlines can significantly reduce mishandling incidents, improve customer satisfaction, and enhance their reputation in the industry.



AIRLINES & AIRPORTS CONTINUE TO AUTOMATE BAGGAGE PROCESSES



% airlines and airports with planned touchless self-service initiatives by 2025

In the wake of the pandemic, airports and airlines have clearly understood the importance of self-service technology, an area where they ramped up investments, and a trend that continues today.

Baggage handling has become a key area of focus for such initiatives. As the latest data shows, almost all airlines (98%) and most airports (95%) are prioritizing touchless bag tagging options that rely on kiosks and passengers' mobile devices.³ This investment is expected to streamline the baggage handling process and make it more efficient for both passengers and staff.

Furthermore, the implementation of unassisted bag drop is still on the rise, with a considerable number of airlines (96%) and over a third of airports (72%) planning to make touchless unassisted self bag drop available by 2025³. This means that passengers can drop their luggage without the need for assistance from airport staff, which will save time for passengers and streamline the bag drop process.

³ Air Transport IT Insights 2022.



LONG-TERM IMPROVEMENTS IN REGIONAL MISHANDLING



EUROPE



16.60

2007



15.7

2022



NORTH AMERICA



7.05

2007



6.35

2022



ASIA



3.05

2007



3.04

2022

Mishandled bags per 1,000 passengers by region

“Asia Pacific Airlines mishandled baggage performance deteriorated in 2022, with approximately three mishandled bags out of every thousand passengers.

Driven by the strong rebound in travel demand, airlines faced significant operational challenges, including staff shortages and other resourcing issues that resulted in increased disruptions and congestion at airports.

Nevertheless, airlines and airports across the region are taking various steps to improve baggage handling efficiency, including intensifying recruitment and accelerating digitalization efforts.

The industry is proactively working to ensure that it can continue to meet demand and provide excellent service standards to passengers.”

Beatrice Lim
Director, Industry & Regulatory Affairs,
Association of Asia Pacific Airlines

“In 2022, as the aviation industry and globe emerged from the Covid-19 pandemic, U.S. airlines faced staffing and absenteeism challenges across the supply chain that impacted mishandled baggage rates. In aggregate, airlines mishandled 6.35 checked bags for every thousand enplaned.

We are encouraged by the successful, aggressive hiring campaigns that have been launched by U.S. carriers, which now employ the most workers in two decades and anticipate baggage handling numbers to improve as thousands of new employees gain experience and complete training.”

John Heimlich
Vice President and Chief
Economist, Airlines for America

Data Sources:

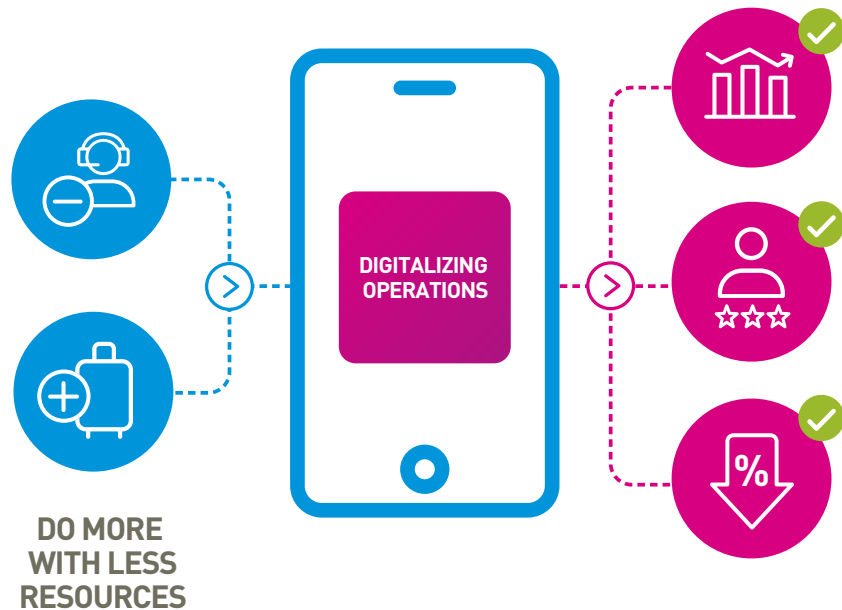
Europe: 2007 - 2013 Association of European Airlines. 2017 - 2022 SITA WorldTracer®.

North America: Airlines for America.

Asia: Association of Asia Pacific Airlines.



THE INCREASE IN MISHANDLING ACCELERATES DIGITALIZATION & AUTOMATION OF BAGGAGE MANAGEMENT



The air transport industry experienced a faster than expected post-pandemic recovery as countries around the world, except for China, swiftly reopened their borders and eliminated the barriers that had disrupted air travel during the pandemic. This development was very welcomed by both the industry and passengers alike.

However, a less favorable consequence of the resumption of air traffic was the emergence of baggage mountains. The sudden influx of travelers caught the industry off guard, resulting in global issues and significant disruptions from Europe to Australia and the Americas. Larger airports, particularly those with high volumes of transfer bags, experienced the most severe repercussions, which subsequently affected smaller airports as they had to handle the repatriation of these bags.

It is worth restating that mishandled bags are predominantly associated with international travel and transfers, accounting for nearly half of all cases. Interestingly, airports equipped with advanced baggage IT systems, such

as Automated Baggage Handling and Baggage Reconciliation, were not the cause of these issues. It was widely acknowledged that the profound impact of staff shortages and recruitment challenges, prevalent in various industries, severely affected the airline sector.

The pandemic has undoubtedly dealt a harsh blow to the airline industry, surpassing the impact on other sectors. Airlines, airports, ground handlers, and supporting services were forced to quickly adapt to survive, implementing downsizing measures and furloughing employees. In 2021, Heathrow recorded the lowest passenger numbers in 50 years, and globally, the total number of passengers plummeted from 4.54 billion to 2.28 billion.

Many workers who either resigned or lost their jobs have yet to return, leaving a workforce shortage in critical areas such as ground handling. Last year, approximately 50 million employees resigned in the United States, and similar trends were observed in the UK, France, and Singapore, where work patterns have changed significantly compared to the pre-COVID era.

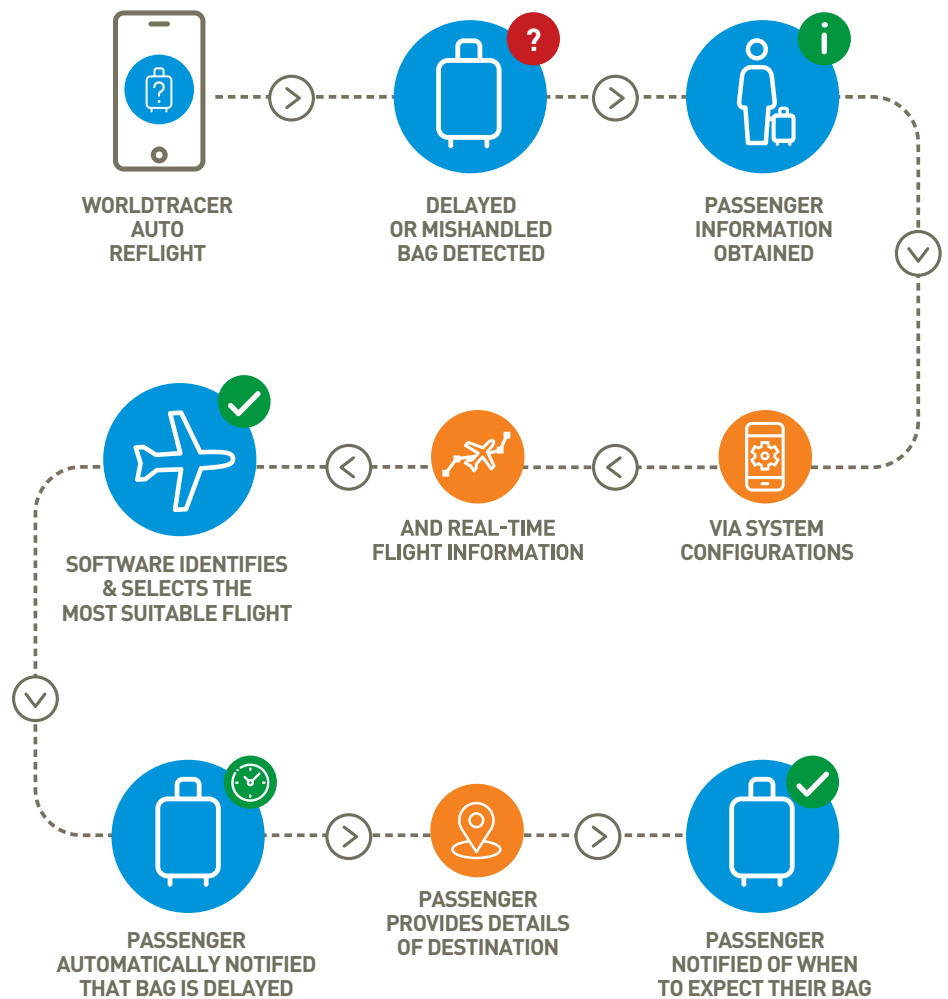
Issues stemming from reduced or inexperienced labor forces in the air transport industry, include flight cancellations, delays, mishandled baggage, and long security queues, all of which pose a threat to the industry's long-term recovery.

Consequently, the industry is now actively seeking to accelerate the automation and digitalization of baggage processes. Throughout the pandemic, SITA, as a company, focused on assisting its customers in improving this area. One notable accomplishment was the launch of SITA's Automatic Baggage Reflighting service, a unique solution in the market that addresses this global need. This service is fully integrated with WorldTracer and BagMessage, ensuring effective communication with the WorldTracer community and Baggage Reconciliation System (BRS) providers, regardless of the vendor. Moreover, when coupled with an automatic notification service, our customers can achieve true automation in handling mishandled bags, allowing them to allocate more time to other important baggage-related matters.

Nicole Hogg, Product Management Director, Baggage, SITA



LUFTHANSA USE CASE: AUTOMATION OF BAGGAGE REFLIGHT



SITA and Lufthansa have partnered to explore ways to automate baggage reflight operations and improve the passenger experience while also reducing the cost of mishandled baggage. Mishandled baggage is a significant pain point for the aviation industry and costs billions of dollars each year. The pandemic also added to the challenge of staff shortages, making automation of reflight processes essential.

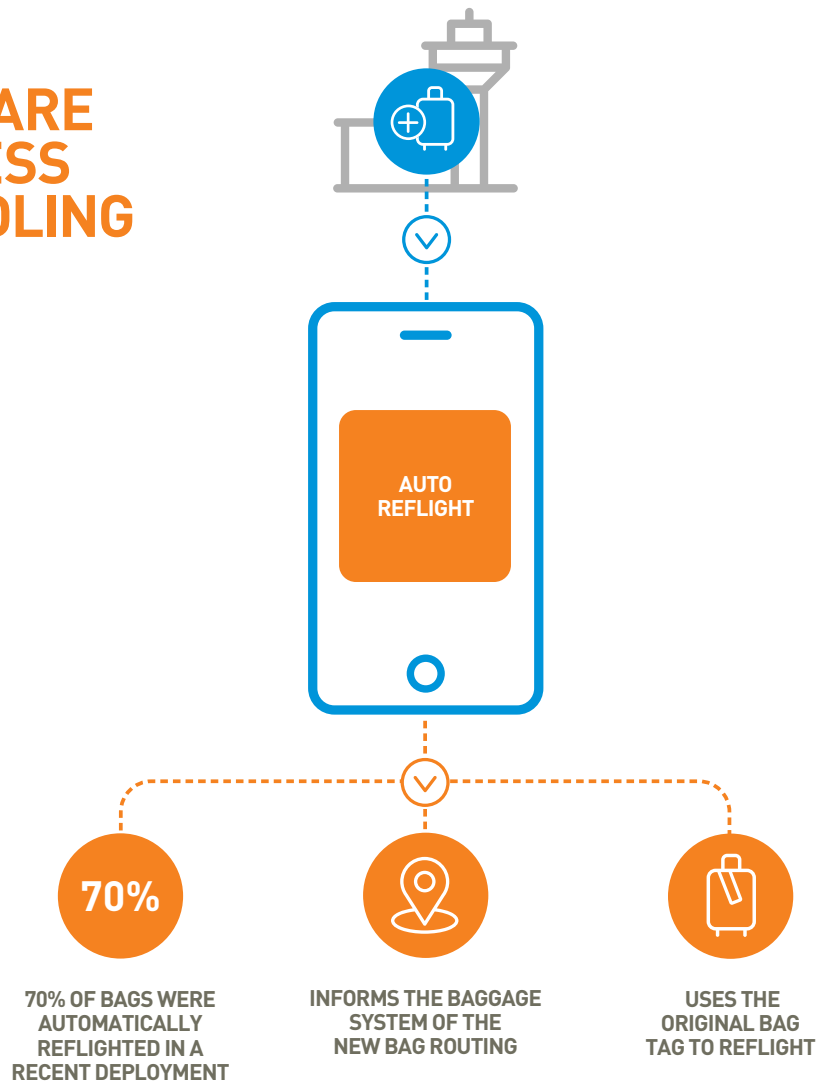
SITA's WorldTracer Auto Reflight system suggests suitable routing for rush bags and informs the baggage system of new bag routing using the original bag tag. It is a collaborative innovation that uses digital automation to reduce costs and inconvenience, while contributing to sustainability and CO² targets. SITA estimates that automation of reflight operations could save the industry up to \$30 million per year. Lufthansa and SITA's partnership aims to digitalize the manual reflight process, and the results of their Proof of Concept suggest that

they can automatically reflight as much as 70% of Lufthansa's mishandled bags at Munich Airport.

Ultimately, the baggage reflight solution ensures that when a bag is mishandled, it reunites with its owner in a simple and fast fashion, thus meeting a critical industry baggage management requirement to tackle the mounds of mishandled baggage as travel reaches its pre-pandemic levels.



AUTOMATION & DIGITALIZATION ARE KEY TO THE SUCCESS OF BAGGAGE HANDLING



In 2022, aviation made a remarkable recovery worldwide as borders reopened and pandemic-related barriers to travel were removed. The rapid increase in traffic against a backdrop of workforce shortages, especially in critical areas like ground handling, led to challenges in baggage operations. As the industry continues to recover, there is an opportunity to rethink the baggage experience to deliver more choice, flexibility, and a more seamless experience for passengers.

Technology is the key. Digitalization and automation present significant opportunities to enhance operational performance and efficiency. Developments in real-time tracking, adoption of electronic bag tag (EBT), and the increasing use of Bluetooth technology among passengers can also be harnessed.

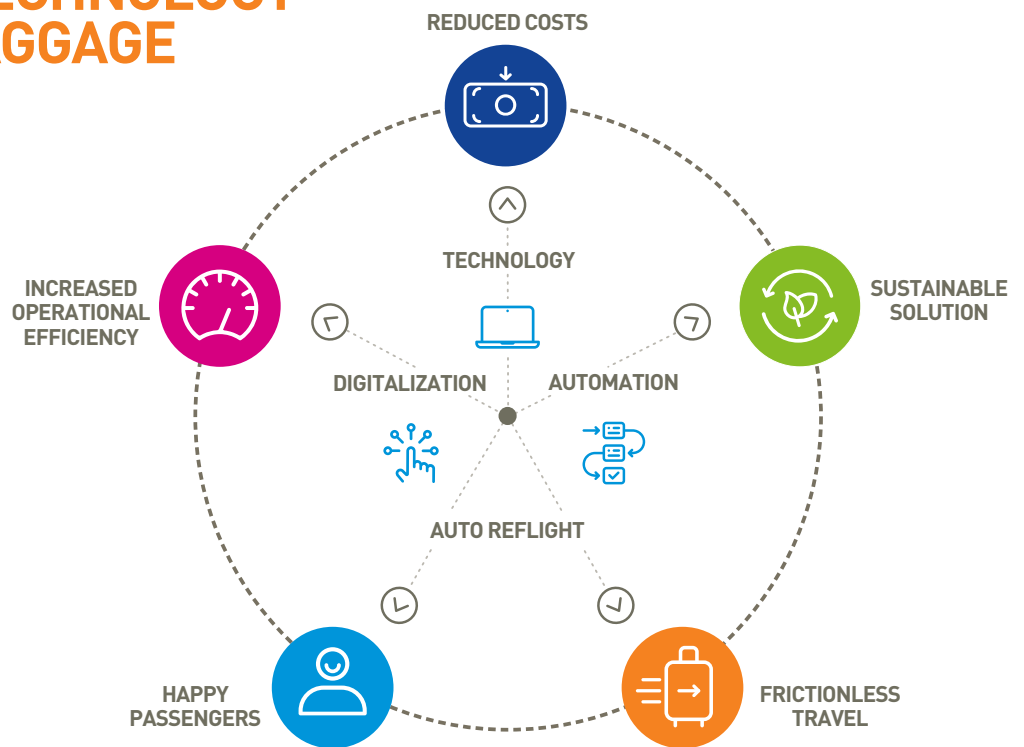
To leverage the power of technology, cooperation across the value chain and with governments is critical. IATA is committed to facilitating this journey through its baggage working groups which provide a platform for collaboration among stakeholders

to address their common baggage challenges by developing standards, global best practices and innovation with the ultimate goal of enhancing the overall passenger experience.

Getnet Taye
PhD: Senior Manager Global Baggage
Operations & Innovation IATA



LEVERAGING TECHNOLOGY TO IMPROVE BAGGAGE HANDLING



Looking back at 2022, Airports Council International (ACI) has seen our airport members continue their recovery from the pandemic, only to be faced with similar passenger and baggage volume challenges as in 2019. The big difference is that pre-pandemic mishandled baggage rates were at their lowest ever (5.6 mishandling rate in 2019⁴), while today, the number has increased considerably (7.6MHR in 2022). The sudden surge in travel has led to increased disruptions that are compounded by a shortage of skilled staff. The good news is that at ACI we see many of our airport members accelerating their digitalization initiatives, particularly for baggage operations.

The airport focus is on leveraging technology and data-driven practices to improve agility and enable rapid responses to sudden changes in passenger and baggage volumes. In this regard, airports are prioritizing not only the passenger side through self-service initiatives that automate existing baggage processes, but also integrating baggage handling applications that combine tracking, business intelligence, and analytics.

The objectives of digitalization and automation of baggage processes are to minimize costs while optimizing revenue, productivity, and restoring customer confidence. Additionally, the data gathered through these efforts will help airports to make informed decisions, thus ensuring continued business success. Baggage handling has always been one of the more

stressful parts of a passenger's journey, from start to finish, so the automation of these processes and using 'smarter' software are vital to reducing mishandled baggage.

At ACI, we are actively working with our airport members to ensure the digitalization of baggage operations to remain competitive and meet the needs of their passengers, remains a top priority. By leveraging technology and data-driven practices, airports can optimize baggage handling, minimize costs, and enhance the overall passenger experience.

Thomas Romig
Vice President Safety, Security
and Operations, Airports
Council International (ACI) World

⁴ SITA Baggage IT Insights 2019.

METHODOLOGY

WHAT IS A MISHANDLED BAG?

A mishandled bag is a report of a delayed, damaged, or pilfered bag which is recorded by either an airline or its handling company on the passenger's behalf and handled as a claim.

SCOPE OF THE 2023 BAGGAGE IT INSIGHTS REPORT

SITA applies a weighting system, based on IATA passenger traffic statistics, to its WorldTracer® data to calculate the baggage mishandling rates. This weighting ensures that the results represent global passenger traffic and compensate for annual fluctuations. Backward comparison with results published pre-2017 should be undertaken with caution.

This report uses IATA's forecast passenger total for 2021 in the analysis of baggage handling performance data. For year-on-year performance comparisons with 2021, passenger numbers and related bag handling statistics have been updated since last year's report to reflect confirmed IATA passenger data for 2021.

NOTES

1. IATA Air Passenger Forecast, March 2023
2. 2022 SITA Air Transport IT Insights
3. 2020 SITA Baggage IT Insights
4. 2019 SITA Baggage IT Insights





SITA AT A GLANCE

Easy and safe travel every step of the way.

- Through information and communications technology, we help to make the end-to-end journey easier and safer for passengers – from pre-travel, check-in and baggage processing, to boarding, border control and inflight connectivity.
- We work with over 400 air transport industry members and 2,500 customers in over 200 countries and territories. Almost every airline and airport in the world does business with SITA, and nearly every passenger trip relies on SITA technology.
- Our customers include airlines, airports, ground handlers, aircraft, air navigation service providers, and governments.
- Our solutions drive operational efficiencies at more than 1,000 airports, while delivering the promise of the connected aircraft to customers of 17,000 aircraft globally.
- We help more than 70 governments to strike the balance between secure borders and seamless travel.
- Created and owned 100% by air transport, SITA is the community's dedicated partner for IT and communications, uniquely able to respond to community needs and issues.
- We innovate and develop collaboratively with our air transport customers, industry bodies and partners. Our portfolio and strategic direction are driven by the community, through the SITA Board and Council, comprising air transport industry members the world over.
- We provide services over the world's most extensive communications network. It's the vital asset that keeps the global air transport industry connected in every corner of the globe and bridges 45% of the air transport community's data exchange.
- With a customer service team of over 1,700 people around the world, we invest significantly in achieving best-in-class customer service, providing 24/7 integrated local and global support for our services.
- Our annual Air Transport and Passenger IT Insights reports for airlines, airports and passengers are industry-renowned, as is our Baggage IT Insights report.
- We are a certified CarbonNeutral® company, reducing greenhouse gas emissions for all our operations through our UN recognized Planet+ program. In 2022, we committed to setting science-based emission reduction targets aligned to the Science Based Targets initiative Net-Zero Standard.
- We also develop solutions to help the aviation industry meet its carbon reduction objectives, including reduced fuel burn and greater operational efficiencies.



or further information, please visit www.sita.aero

For further information, please contact SITA by telephone or e-mail:

Americas

+1 770 850 4500
z@sit.aero

Asia Pacific

+65 6545 3711
info.apac@sit.aero

Europe

+41 22 747 6000
info.euro@sit.aero

Middle East & Africa

+961 1 637300
info.mea@sit.aero

Follow us on www.sita.aero

