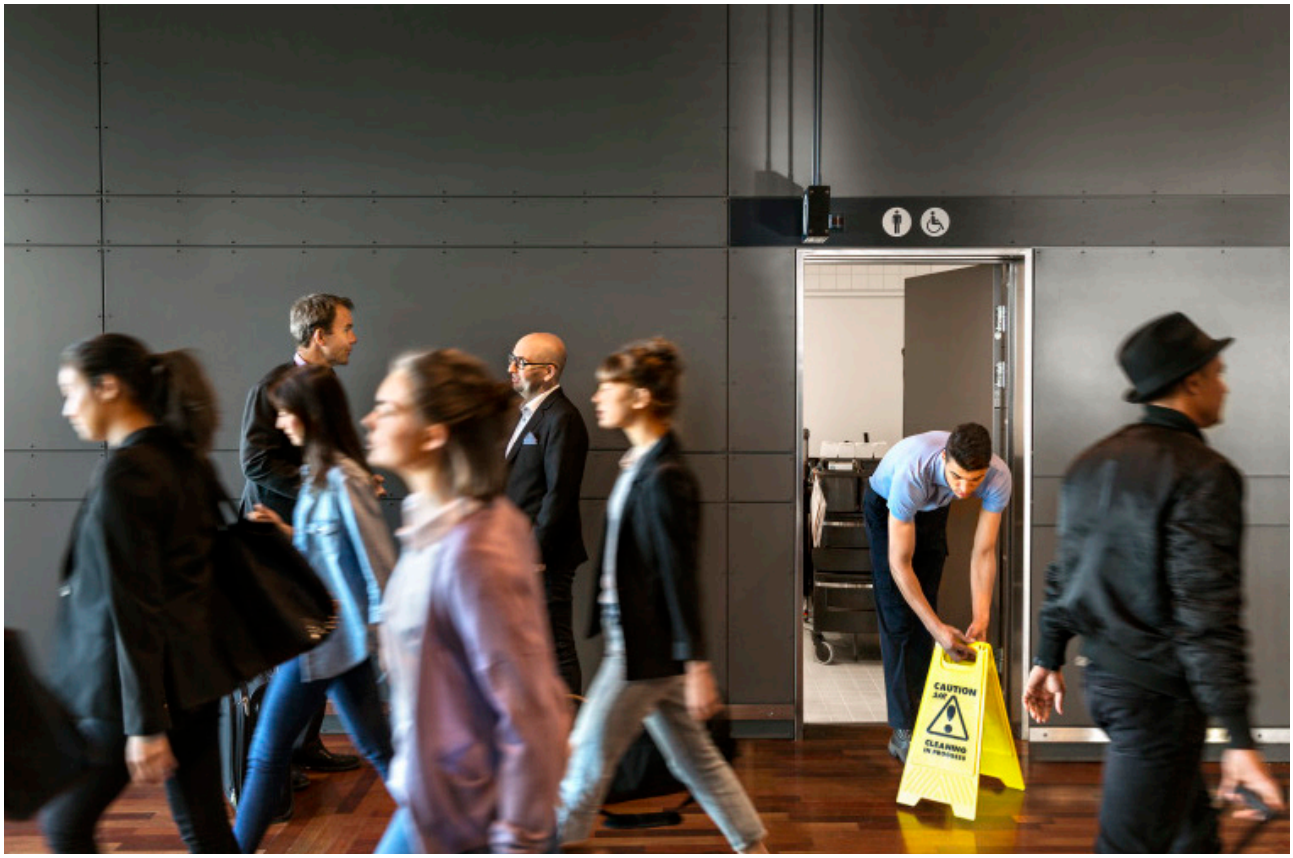
TORK Think ahead.

Cleaner airports, better business

A whitepaper focused on improving passenger satisfaction and airport revenue.



The incredibly high-traffic environments of airports present significant challenges when it comes to keeping terminals clean, especially in a post-pandemic environment of heightened hygiene awareness and higher expectations about hygiene.

Higher standards for cleanliness are placing a growing demand on airport facility managers. Technology in the form of data-driven cleaning can help. However, the technology and data are not just about introducing sensors and new tools but rather about creating more value – for passengers, for operations and for staff.

This whitepaper combines the most up-to-date research on the link between cleaner washrooms and better business outcomes, why data can solve both long-standing and new challenges, and results from real-world airport customers working with this new digital approach.

Airports are on the rebound

Worldwide, air travel is growing. Passenger traffic could reach 8.2B by 2038, growing at an annual rate of 3% on average, according to the International Civil Aviation Organization (ICAO).[1] But this growth comes at a more variable and unpredictable pace than analysts anticipated just five years ago as a result of what IATA dubbed "the largest shock in aviation's history"[2]: COVID-19.

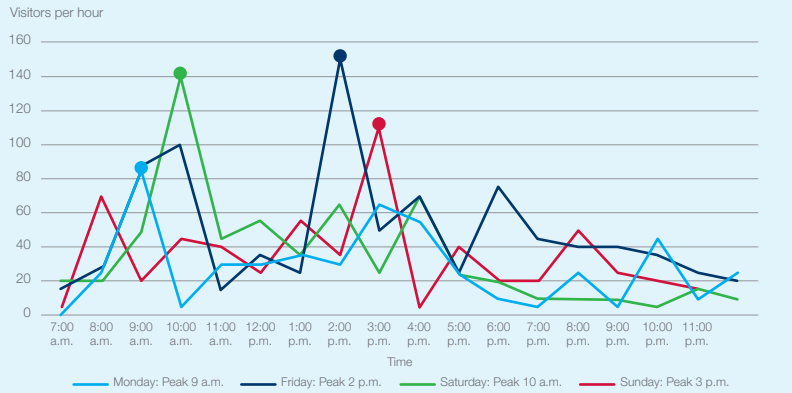
Airports Council International expects passenger traffic to reach 92% of 2019 levels in 2023, driven predominantly by travel in the US[3]. ACI also predicts 2024 to be a "milestone year" with an expected 9.4B passengers (102.5% of the 2019 level).[4]

Despite the encouraging outlook, many airports still expect their executives to cut costs and do more with less.

Foot traffic is not only massive in large airport facilities but also varies significantly in different areas, which are also spread out across a large area. Operations must abide by strict security measures and protocols, which add incremental demands and complexity to their management. Plus, as a consequence of COVID-19, passenger expectations on hygiene have increased, with as many as 80% of consumers saying that they expect an even more hygienic public washroom environment than before the pandemic.[5] All of this puts a lot of additional pressure on budgets that are already increasingly stretched thin.

Not only have traffic and expectations on hygiene changed, but most airports are now operating as commercial entities and must generate economic returns. Consequently, non-aeronautical revenue (revenue generated from retail, food and beverage concessions, parking and other activities) has become increasingly important: it can amount to as much as 40 to 50% of airport income,[6] making it key to supporting their economic viability. Sustaining and increasing this significant element of airport revenue structure is increasingly important to management.

Real-time data on visitor traffic in an airport washroom area: per hour, day and week



Visitor traffic **peak periods** vary significantly.

Mon peak: **9:00 a.m.**

Fri peak: **2:00 p.m.**

Sat peak: **10:00 a.m.**

Sun peak: **3:00 p.m.**

How do you service areas well if you don't know traffic fluctuations and therefore the need?

[1] ATAG Aviation: Benefits Beyond Borders. Available online: https://www.atag.org/our-publications/latest-publications.html (accessed on 5 December 2021).
[2] IATA, 2022. "Global Outlook for Air Transport
[3] ACI, 2023. "Annual World Airport Traffic Report. Available online
[4] ACI, 2023. "Latest air travel outlook reveals 2024 to be a milestone for global passenger traffic." Available online.
[5] United Minds in coop. w/ CINT, March 2021. Survey covers UK, USA, China, Germany, France, Spain, Sweden.
[6] Liutov, 2021. "Non-Aeronautical Revenues and New Business Models: Topic to be explored at the ACI WAGA pre-conference workshop." Available online.

Top challenges of airport cleaning

A global Essity-commissioned research study done in 2023 outlines five common concerns for executives responsible for airport cleaning operations.

Challenge	What's happening	Why it matters
Cleanliness and hygiene	A top priority - Heightened expectations on cleanliness and hygiene post-COVID-19, with reviews shared on social media - Hard to keep up with cleaning needs, emergencies and continuous cleaning requirements - High foot traffic adds additional demands on the quality, longevity and efficiency of hygiene dispensers, leading to more frequent refills and equipment replacement	Passenger satisfaction declines when cleanliness is poor, causing complaints and negative impact on non-aeronautical revenue
Speed of throughput	- Inefficient or unintuitive washroom products slow down washroom traffic and cleaning efforts	Longer visits and long washroom queues mean passengers spend less time shopping and eating
Staffing	- Lack of staff and high personnel turnover - Recruitment is difficult and takes time - Ensuring that employees are motivated to do their tasks well is time-consuming	Lack of staff and/or engagement can lead to compromised cleaning standards
Efficiency and resource optimisation	Operations need to get more done with the same or fewer resources - Pressure to increase operational efficiency in high-traffic segments is very high - Small time stealers quickly multiply and become large time stealers - Efficient allocation of labour is increasingly important	Resource allocation can affect cleaning standards, which affects passenger satisfaction and non-aeronautical revenue
Waste and increasing sustainability expectations	- Passengers and airport management are increasingly demanding environmentally friendly products - Large quantities of products involved at high-traffic airports make waste a significant concern	No or insufficient evidence of commitment to the environment can lead to complaints and negative image

Why passenger satisfaction is a must

Passenger satisfaction has always been important to successful airport operations, but as non-aeronautical revenue becomes a key determinant of their economic viability, it is now critical. Research is finding that non-aeronautical revenue is significantly impacted by passenger satisfaction. One study showed that a 1% increase in customer satisfaction can lead to a 1.5% growth in airport revenue.[7] Another showed that passengers who reported being "delighted" with their airport experience spent more.[8]

The largest factor affecting passenger satisfaction? Cleanliness, especially after COVID-19. Research has shown a positively correlated link between passenger satisfaction and perception of terminal cleanliness. Washroom cleanliness alone made up more than 50% of the terminal cleanliness score.[9]

Delighted passengers tend to spend more

1% = 1.5%

Increase in passenger satisfaction

Increase in non-aeronautical spending

Other studies have found:

- Dirty and overcrowded washrooms are the top issue for guests in high-traffic venues[11]
- 71% of guests at high-traffic venues have had a negative washroom experience[12]
- One in three guests in busy venues (including transportation hubs) report that they limit how much they eat and drink to avoid visiting washrooms[13]
- A study of building service contractors and commercial cleaning providers found that washrooms were the top cause of complaints (45%), significantly more than the next six areas of a building[14]

These findings demonstrate that cleaner terminals can improve passenger satisfaction, and that cleaner washrooms in particular can contribute to improved perceptions of terminal cleanliness and therefore also passenger satisfaction. As a result, airports that want to increase non-aeronautical revenue should focus on increasing passenger satisfaction and should start where

Terminal cleanliness has a far larger impact on passenger satisfaction after COVID-19.[10]

they can make the biggest impact: terminal cleanliness, especially washrooms. As the airport often is the first and last impression passengers have of their trip, the airport washroom experience is a make-or-break moment.

Why cleaning shouldn't be on autopilot

Airport cleaning challenges are significant and long-standing. However, many facilities' approach to cleaning is inefficient. A recent quantitative study commissioned by Essity with facility managers and cleaning staff reported that[15]:

- 51% of cleaners said that if dispensers were quicker and easier to refill, they would have more time for other cleaning tasks
- 70% of cleaners regularly find dispensers empty
- 70% of cleaners said they regularly clean unused rooms

In addition, aggregated data from sensors in Tork hygiene dispensers show that 91% of dispenser checks with traditional static cleaning are unnecessary.[16] In an airport that can have more than 6,500 dispensers that are each checked 12 times per day, this adds up to a significant amount of time spent on an unnecessary task and a significant waste of time.

91% of dispenser checks with traditional static cleaning are unnecessary.[16]

[7] ACI, 2019. "Airport customer experience, between management and execution." Available online.
[8] JD Power, 2023 North America Airport Satisfaction Study. Available online.
[9] www.researchgate.net/publication/358581786_How_to_Achieve_Passenger_Satisfaction_in_the_Airport_Findings_from_Regression_Analysis_and_Necessary_Condition_Analysis_Approaches_through_Online_Airport_Reviews
[10] Bakr et al, 2022. "How to achieve Passenger Satisfaction in the Airport?" Sustainability, https://doi.org/10.3990/su14042151
[11] IPSOS survey of 3,000 people in USA, UK, Germany, France, Poland and Sweden who have recently visited a high-traffic venue, realised in 2016
[12] Ibid.
[13] Ibid.
[14] Statista: average across 2017 to 2021, 185 respondents, North America, building service contractors and commercial cleaning providers
[15] Qualitative and quantitative office segment research with 600+ respondents in North America and Europe, by Behaviorally in June 2022
[16] Based on customer dispenser checks over 6 months before vs after installing Tork Vision Cleaning (between June – December 2019). Measured across 16 sites connected to Tork Vision Cleaning, with each dispenser check taking approx. 20 seconds. Tork Vision Cleaning was formerly known as Tork EasyCube.

What if cleaners knew which dispensers needed to be replenished, when and where? What if cleaners had real-time information on what areas needed cleaning and when?

Data-driven cleaning – what it is

Data-driven cleaning is a new way of working that is a departure from fixed cleaning schedules based on estimates. Real-time data transforms set cleaning routes into need-based work, enabling staff to clean and replenish supplies where and when it is required, helping them work much more efficiently. This means that cleaners can allocate their time and attention proactively instead of reactively, minimising complaints and eliminating unnecessary work.

Real-time data also empowers airport facility managers to make more informed decisions based on facts and numbers – a critical ability in a large and complex facility where foot traffic and cleaning needs vary widely every day and in every area. This helps cleaning staff optimise their time by cleaning where it's most needed and eliminating unnecessary over-cleaning.

Data-driven cleaning – how it works

Tork Vision Cleaning combines software with connected devices to provide real-time data on cleaning needs based on visitor traffic and refill levels in dispensers. This real-time data empowers cleaning teams to work more proactively and efficiently, helping them achieve more consistent and higher levels of cleanliness.

> **"It is all about the data. We track whatever we can in order to be on top of things and as efficient as possible.**

Facility Manager, Airport location: Germany

How Tork Vision Cleaning provides real-time data

People counters and connected dispensers
People counters and connected dispensers measure visitor traffic and refill levels. A gateway collects the data and communicates with the cloud.

The cloud
Data from the gateway is collected in cloud software powered by Microsoft Azure, ensuring security, reliability and scalability.

Cleaner view
Cleaners easily access real-time information on a tablet or mobile phone, showing them where to clean and what to replenish.

Manager view
A manager application provides customised insights to optimise cleaning and detailed cleaning reports to show adherence to KPIs and proof of service.

The business case for data-driven cleaning: five critical objectives

Tork Vision Cleaning is the world's leading facility management solution for data-driven cleaning with proven and measurable results. It helps facility managers and cleaning companies dramatically improve cleaning quality and supports five critical objectives.

1. Maximise passenger satisfaction

Airport washrooms are key to passenger satisfaction. Since empty dispensers are a top source of complaints, washrooms should be equipped with easy-to-use, fast-dispensing, high-capacity dispensers. They should also be easy to service and replenish to minimise obstacles to the smooth flow of washroom traffic.

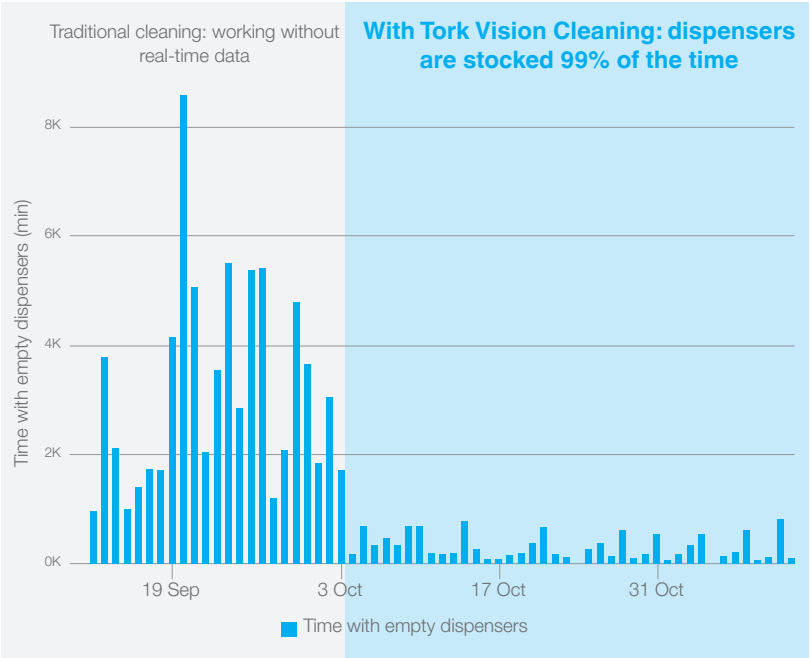
With real-time information on when dispensers need to be replenished, cleaners can ensure that they are full and ready to use before passengers experience a lack of supplies and register complaints.

Airport snapshot: Data-driven cleaning reduces passenger complaints

When facility managers at one busy airport reviewed data on empty dispensers soon after implementing Tork Vision Cleaning, there was a **clear reduction in dispenser run-outs.**

Dispensers equipped with sensors were installed in the terminal while cleaning staff were still using a fixed schedule (see chart below). The chart clearly shows there were many days when dispensers were empty, resulting in dissatisfaction and complaints. On 3 October, the cleaning staff began using the software and the data-driven way of working, cleaning washrooms and replenishing dispensers when and where needed as guided by the data. As a result, the amount of time that dispensers stood empty was dramatically reduced, and dispensers were refilled and ready to use 99% of the time.

By reducing the instances and time of dispensers being empty, cleaners can eliminate one of the most frequent (and most valid) reasons for passenger complaints.



80%

of Tork Vision Cleaning customers said that they reduced complaints as a result of using the system

30%

increase in customer satisfaction levels[17]

[17] Statistics based on anonymous survey results conducted in March 2021 of 34 Tork EasyCube customers in Europe and North America

2. Enhance operational efficiency

With fixed cleaning schedules, variations in foot traffic over hours, days and weeks present a significant operational challenge in large facilities with geographically dispersed areas, such as airports. Data-driven cleaning replaces set schedules with a true need-based way of cleaning. This method optimises resource allocation and improves efficiency by eliminating unnecessary dispenser checks, cleaning rounds and refill trips.

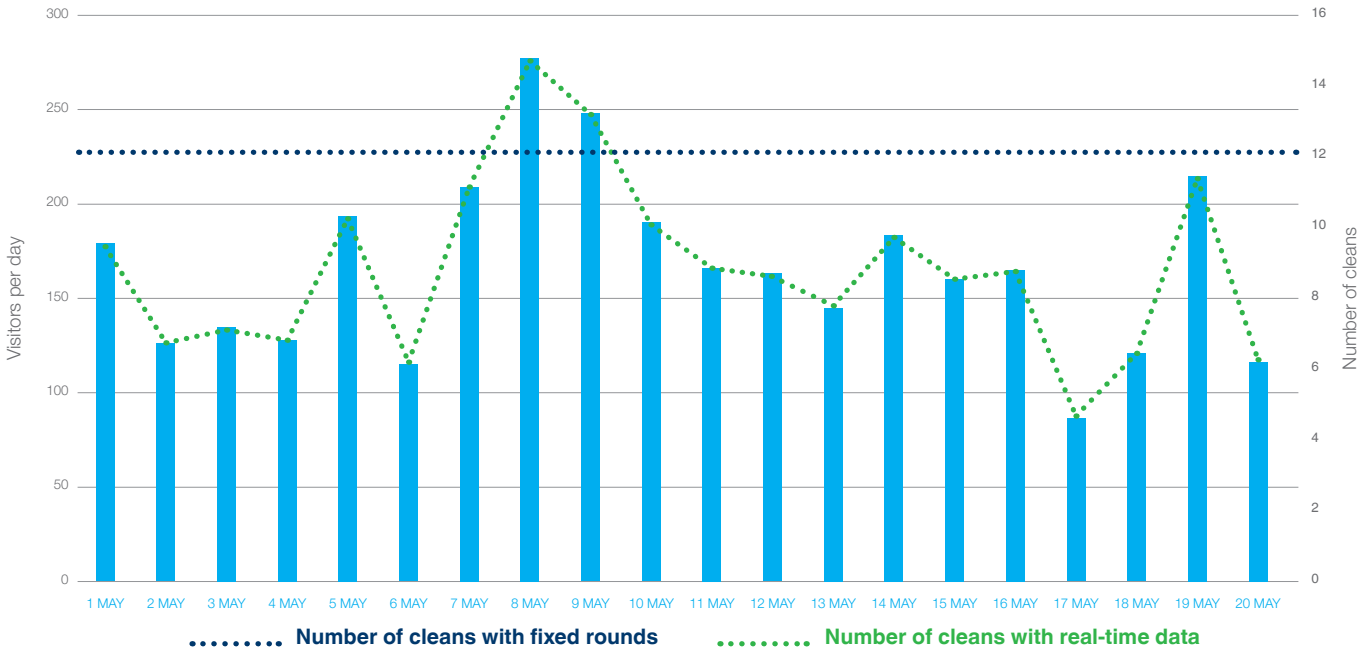
Tork Vision Cleaning software provides facility managers with real-time information on foot traffic volume and patterns, including which areas see the highest traffic, as well as peak days and hours. Managers set threshold cleaning levels for when to clean each area based on the number of visitors, i.e. they should clean when each area has had 70 visitors. The software then calculates and shows when each area should be cleaned. High-traffic areas need to be cleaned more often and lower-traffic areas less often. This prevents and reduces over- and under-cleaning, optimising the efforts of cleaning staff.

Airport snapshot: Need-based cleaning leads to greater efficiency

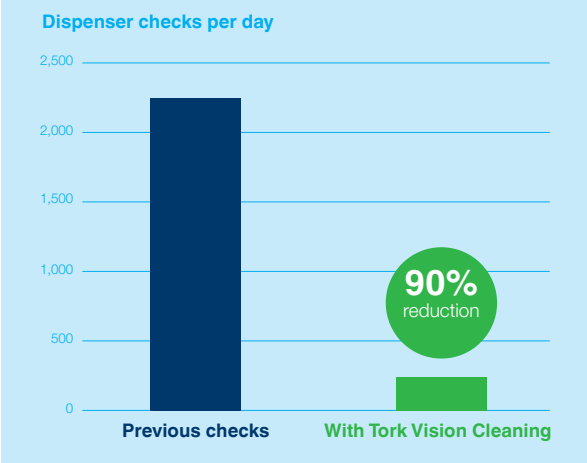
When one UK-based airport hosting over 60M passengers per year implemented Tork Vision Cleaning, it resulted in **30% fewer cleaning rounds** in the airport's less-busy areas – enabling managers to allocate more staff to areas that needed more cleaning. (Chart 1)

In addition, hygiene dispensers equipped with sensors sent alerts when they needed to be refilled, **reducing dispenser checks by more than 90%** and saving the cleaning staff hours every week. (Chart 2)

1. Cleaning with real-time data can mean 30% fewer cleans



2. Real-time data means fewer dispenser checks per day



>90%
reduction in dispenser checks

>3,000 hours
saved per year

The path to 70% fewer cleans: An airport case study

One large European airport serving more than 17M passengers annually operated by a fixed cleaning schedule that required cleaning washrooms 24 times a day. When complaints came in, managers would increase the number of cleaning hours, but this didn't reduce or resolve the complaints, which continued on an irregular basis.

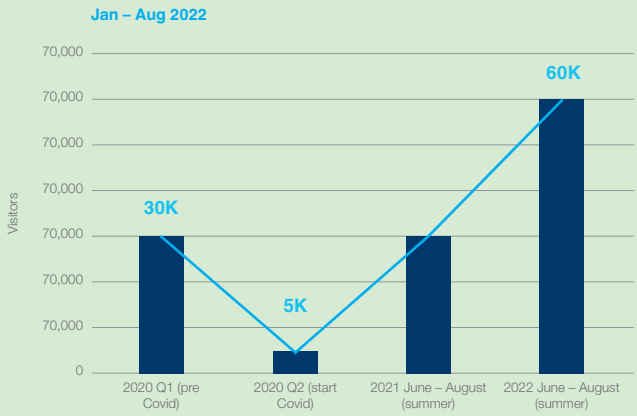
In 2017, the airport switched to data-driven cleaning with Tork. Cleaners were equipped with tablets that showed when to clean different areas and which dispensers to replenish based on real-time data on how many people had visited each area and the refill status of dispensers. This empowered cleaners to clean when needed based on the number of visitors instead of a set time.

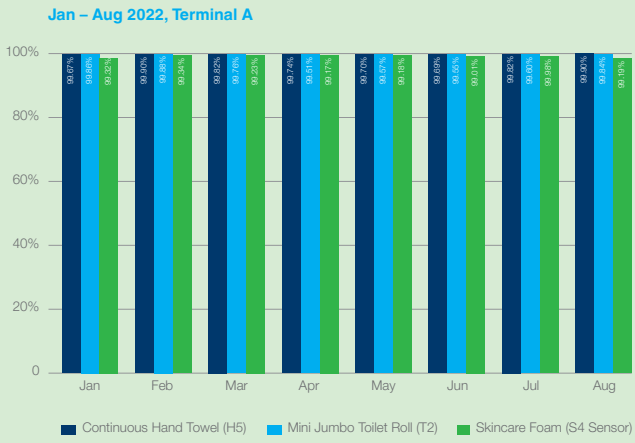
Then COVID-19 hit. In 2020, washroom visits suddenly went from 30,000 a day to just 5,000 – a drop of 84%. The software directed fewer cleans based on the reduced traffic.

But as the pandemic began to subside in the summer of 2022, passenger traffic suddenly and quickly swelled to more than 60,000 – double pre-pandemic levels.

The data on passenger traffic per area of the airport enabled the cleaning staff to adjust cleaning to this sudden change. Some washrooms had to be cleaned more times than before – up to 22 times a day – and others much less, some only twice per week. This resulted in fewer total cleanings – 8 cleanings per day vs a pre-COVID-19 average of 24, a 70% reduction.

Yet even with significantly fewer cleanings, data enabled the airport to maintain higher and more consistent levels of cleanliness compared to its previous fixed cleaning schedule, and no washroom paper run-outs. What's more, the airport logged zero passenger complaints about empty dispensers despite serving twice the number of visitors.





Before

Cleaning model:
frequency-based (fixed)

24 daily cleans (424 total)

30,000 visitors (per day)

After

Cleaning model:
Data-driven (needs-based)

8 daily cleans (109 total)

65,000 visitors (per day)

Results

Daily cleans were reduced by 70%

Zero complaints about empty dispensers

3. Support staff motivation and engagement

People are by far the most critical resource in the facility services industry. When employees are satisfied and engaged with their work, it's good for them and good for operations – especially given the industry's historically high rates of absenteeism and turnover. In a business that depends on people to keep facilities at a high level of cleanliness and hygiene, it's critical to empower them to be productive, which also can support greater job satisfaction and staff retention.

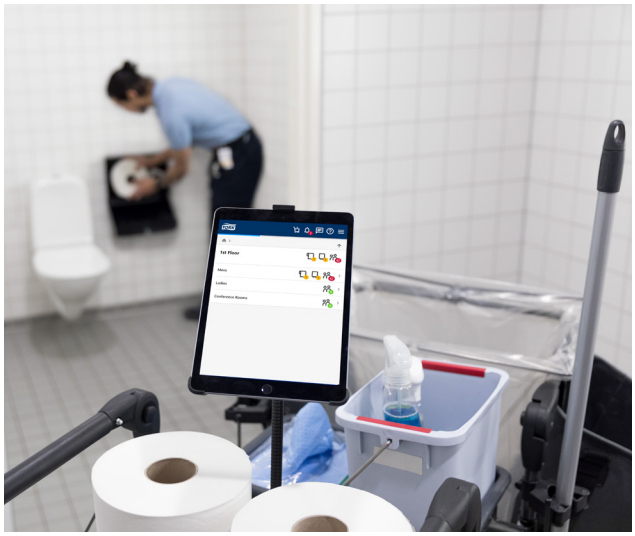
When employees have more control over their work, they experience less stress and more engagement. Giving cleaners access to information to proactively prevent complaints transforms repetitive tasks into more meaningful work.

In addition, this technology helps newly hired cleaners get up to speed on their jobs faster. With real-time information about cleaning needs and their priorities, they require less training on where, what and when to clean.

"

The system enables us to improve the workday of our staff. We believe that giving cleaning staff more control over their work will reduce stress levels and help make the work feel more meaningful, as the staff can spend time cleaning where it is actually needed.

Ann-Catrine Gobbato Henningsson, Facility Manager, Swedavia at Landvetter Airport, Sweden.

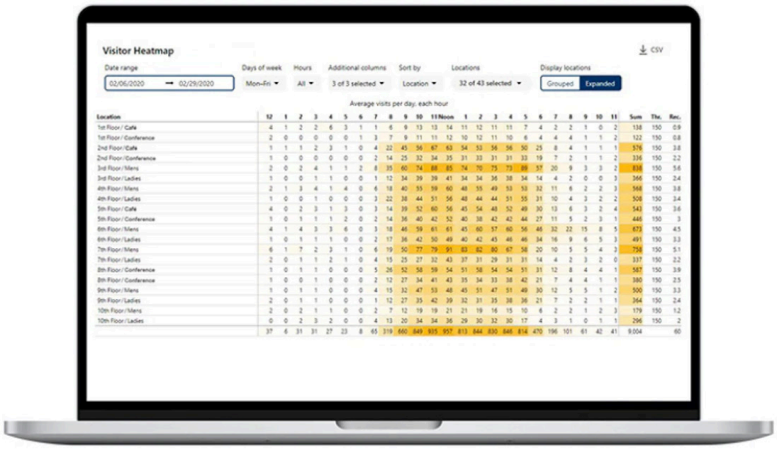


4. Show compliance and proof of service

Although service quality has always been an important goal, the lack of objective data has made it difficult for facility managers and service providers to demonstrate cleaning performance and value. They are increasingly expected to show evidence of meeting requirements for cleaning and hygiene, which can involve additional and time-consuming administration and reporting.

Data-driven cleaning software helps with built-in reporting tools that not only quickly deliver insights on how to most efficiently allocate resources but also show proof of service and adherence to cleaning KPIs.

As an example, the heatmap functionality in the Tork Vision Cleaning software provides an overview of foot traffic per area and time of day as well as data showing completed cleans versus the number of recommended cleans.



5. Demonstrate sustainability efforts

Data-driven cleaning doesn't just improve operational efficiency – it can also support airport sustainability efforts.

Worldwide, passengers' increasing demand for environmentally responsible products and practices has prompted airports to examine what they can do to reduce their environmental footprint. The data provided by connected dispensers and people counters informs cleaners exactly when to replace tissue rolls, towels and soap, avoiding the common practice of discarding half-used rolls and towel stacks to replace them with full ones when doing the cleaning – an inefficient and wasteful way of working.

In addition, eliminating unnecessary cleaning rounds also cuts down on the use of cleaning products, water, equipment and other materials. Data-driven cleaning can help airports lower their use of water and cleaning chemicals by reducing the number of cleans, and can extend the life of cleaning equipment, mitigating the environmental impact of their cleaning operations.

Choosing environmentally sound hygiene products can further contribute to sustainability efforts. Tork products are produced with responsible fibres, have third-party certifications and reduce consumption and waste from one-at-a-time dispensing functionality. Tork third-party certified products can also help earn additional LEED credits, an important way to demonstrate environmental commitment. Below are a few examples of concrete choices to minimise the environmental footprint of a large facility such as an airport:

Tork SmartOne is an efficient toilet paper system with sheet-by-sheet dispensing that reduces consumption by up to 40% compared to traditional jumbo roll dispensers.

The **high-capacity Tork foam soap system** reduces consumption by up to 50%.

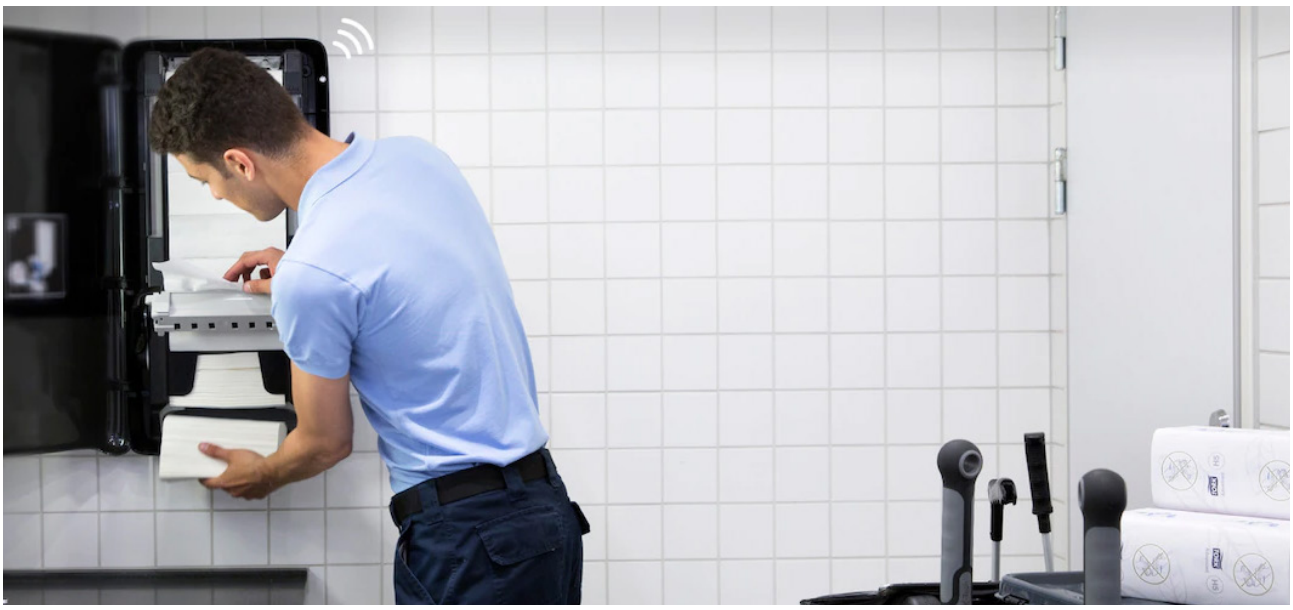
Tork Clarity soap is biodegradable and 99% of ingredients are of natural origin.

Switching from C fold handtowels to the **Tork PeakServe** high-capacity hand towel system reduces waste by 28%.

Tork PaperCircle, the world's first recycling service for hand towels, can reduce waste by 20%[18] and total carbon output by at least 40%.[19]

[18] Based on results from Tork PaperCircle® pilot customers in Germany and The Netherlands

[19] The CO2 savings calculated per month for an average office with 800 employees. Estimation based on a third-party verified life-cycle assessment for EU average conditions, where avoided processes from alternative use of fresh fibres and energy were considered. Potential savings in kg of CO2e are calculated based on the result from the life-cycle assessment and the collected weight reported to us.



Better results with data-driven cleaning

A data-driven approach to cleaning and cleanliness will not just meet but exceed the expectations of increasingly demanding airport passengers, support increased revenues and contribute to sustainability initiatives.

Ultimately, the real value of this solution lies in what it empowers people to do: act on real-time information to work more proactively and efficiently, eliminate unnecessary tasks, reduce waste and ensure an even higher and more consistent quality of cleaning. Airports that change to data-driven cleaning will not only see better terminal cleanliness and higher passenger satisfaction but also a more effective and engaged cleaning staff.

Efficiency improvements included:

Fully replenished washrooms on average **99%** of the time

> 20% fewer cleans with quality improved[21]

Significant efficiency gains: hours saved

Don't take our word for it – see what our customers have said:

100%

said our system **helps improve hygiene** in their facility

80%

said they **reduced complaints** as a result of using our system

82%

said they **improved efficiency** as a result of using our system

76%

said they **improved reporting** by using our system

100%

would recommend our system

[20] Based on Tork EasyCube® data from 10 customers measured over 789 days. (Tork Vision Cleaning was formerly known as Tork Easy Cube)

[21] Based on the documented results achieved by three Tork Vision Cleaning customers, measured before and after implementing Tork Vision Cleaning. Airport customers working with Tork Vision Cleaning have demonstrated larger time savings.

Think ahead.

Schedule a site assessment to learn what you could gain with data-driven cleaning. **Contact us:**

tork.co.uk/your-business/solutions/overview/passenger-terminals