Smart washrooms:

The quest for the universality and simplicity

A whitepaper prepared by Charles Paumelle of Microshare

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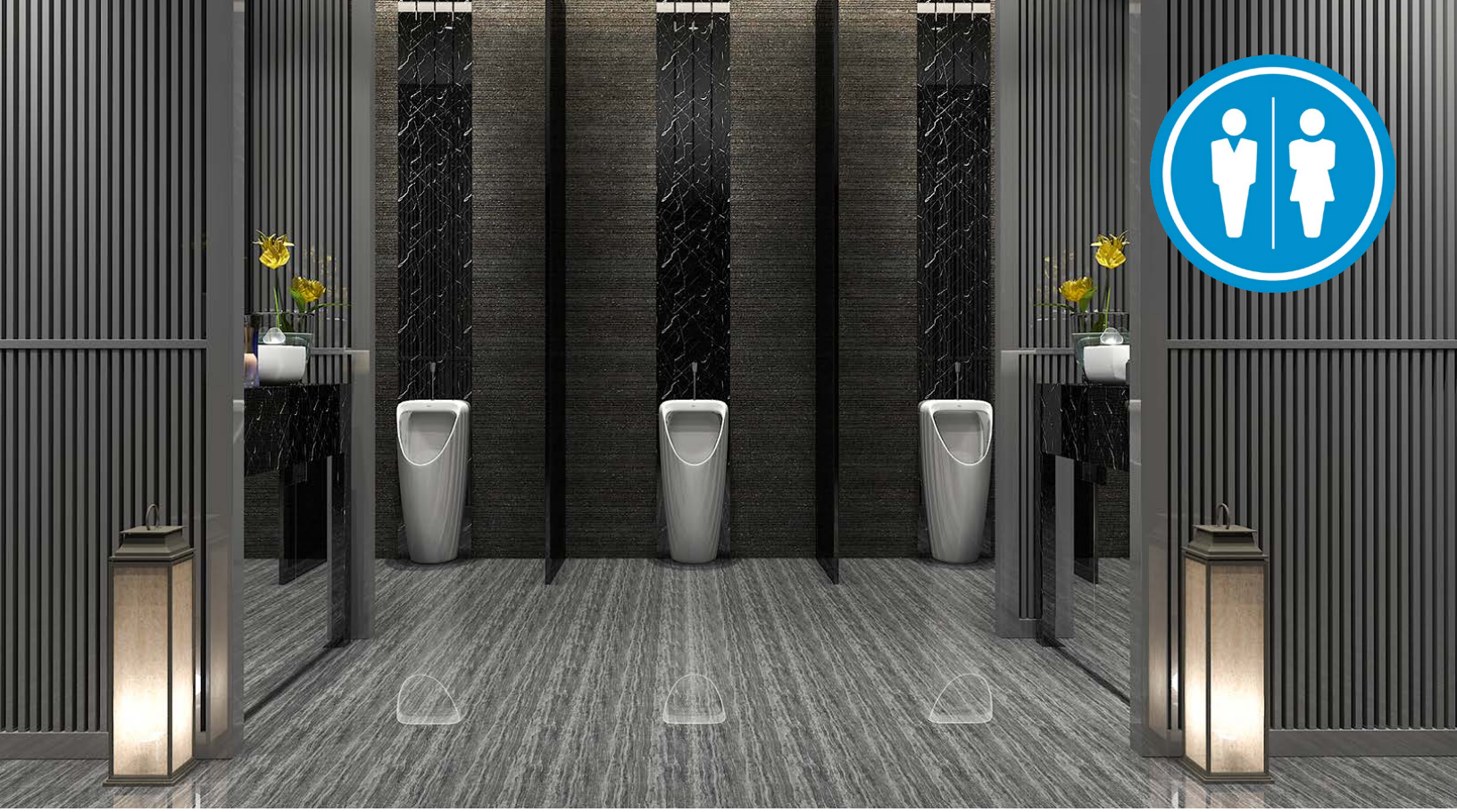


Smart washrooms: The quest for the universality and simplicity

By Charles Paumelle

Executive Summary:

Eighty-six percent of people surveyed say a business's commitment to washroom cleanliness factors into their decision to patronize that location. To ensure customer satisfaction and avoid damage to your brand, it must be a top priority to not only keep washrooms clean and well stocked, but to be diligent in reacting quickly to any issues that arise. The use of smart technology in your washroom enables automation and efficiency. Microshare's EverSmart Washroom solution provides data that drives a responsive approach to cleaning and maintenance to ensure customer satisfaction, avert water and reputational damage, and hold staff accountable for the job at hand.

Introduction

You're on the road with your family. It's been a long day. Everyone's hungry, the kids are fighting in the back seat, your spouse sits quietly in the passenger seat having surrendered any hope of improving your driving or navigational skills. Then, there it is – the perfect roadside joint: burgers, fried seafood, pasta and a giant neon cocktail glass that says "You've done enough today. Pull over and relax." So, you do. You pile into a booth, the waitress drops laminated menus, the kids get crayons and your spouse heads to the restroom. As you peruse the appetizers and entrees, your spouse returns looking like that painting, "The Scream," by Munch.

"Get up, we're leaving. This place is a pigsty."

What just happened? You were ready to tuck into anything that came out of that kitchen – muscles, a pork chop, braised kale (well, maybe not braised kale). But your spouse's reaction to the condition of the washroom brought everything down to the most basic level. It's easy to forget that, in spite of a long day, thirst, some hunger pangs and neon signs offering up the credibility of a nationally recognized brand, this is a disgusting place. The washroom is a fetid, unkept disaster with no soap and water on the floor. The restaurant's logo burns itself into your brain. It becomes a joke called up at dinner parties and family gatherings. "Remember the time we went to that restaurant off the highway? It's associated with filth. No matter how far away from that highway off-ramp you get, your next encounter with the neon martini glass makes the bile rise. You won't be fooled again.

The washroom – we use that neutral term deliberately, because around the world, it's known by many names – is an important fact of life that none of us wants to spend more time in than absolutely necessary. Call it a bathroom, a toilet, a WC, the bog, the head or the "powder room": the nomenclature is beside the point. The fact is, you use one every day.

If you're reading this, chances are that the one you use is cleaned regularly and that the hygienic necessities are available to you, such as paper products, soap, disinfectant, hand dryers, etc. For much of the developing world, that level of sanitation is still an aspiration. Yet that aspiration further demonstrates the universality of washroom expectations. All humans prefer clean washrooms equipped with well-maintained fixtures, reliable water supply and the sanitary products required to finish the job. And given the traumatic experience of the COVID-19 pandemic, all of the truisms are truer than ever.

Your good name matters: The defensive power of data

We live in a hyperconnected world where not only people but "things" are connected 24/7 and available to be viewed on demand. Internet of Things (IoT) technology is collecting data on all sorts of spaces and things, making everything "smart". Washrooms are no exception and, in fact, the discomfort of people to focus on them makes them the perfect use case. The existence of filthy washrooms has for years been blamed on neglect – as if, somehow, this "out-of-sight, out-of-mind" mindset excuses imposing such experiences on your clientele. That logic will not cut it anymore. Your washroom is a dagger pointed at the heart of your customer loyalty goals. Given the universal desire for clean washrooms and the easy, cost-effective availability of anonymized IoT data, the idea that this isn't a manageable risk just doesn't fly.

So how do we make the restroom smart enough to provide often stretched resources the kind of data they need to avert bad outcomes? Much of this is about weaponizing common sense: Is the toilet clogged? Is the soap dispenser empty? Are we out of toilet paper?

But there's a deeper value, too.

- **Is there water on the floor?** This is not only off-putting, but also a potential liability should someone slip and injure themselves.
- **Is the toilet clogged?** Imagine the impact this scenario has on your brand.
- **Is there a serious leak?** Catching a plumbing issue early can mean the difference between a simple fix and closing down for repairs.
- **Is someone "holed up" in one of the stalls?** For both ethical and security reasons, this is something you want to know.

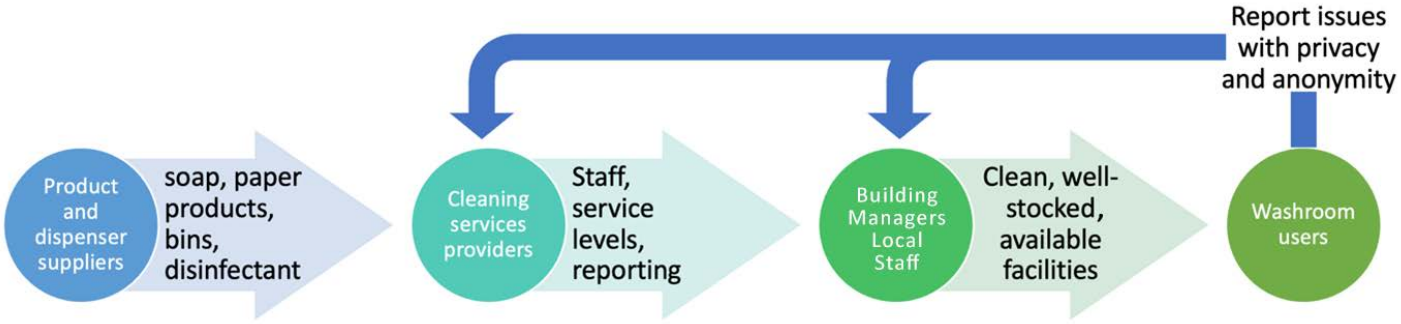
We've all had to deal with the stark reality of plumbing issues in our own homes. There's no context in which a plumbing issue is a good thing. But washrooms in commercial settings carry a heavier shadow. It's not just a matter of telling the kids to use the bathroom downstairs. This is about your brand, your reputation as a competent custodian of your customers' well-being and safety. If a minority of people gave such issues weight in 2019, a majority have been tragically made aware since the pandemic began.

Brass tacks

You probably don't give much thought to restrooms – which is exactly why some of them are miserable hell holes. We need them when we need them, and we pray that in the moment, we're not in a place without plumbing, toilet paper and societal dignity. We've all been beyond that border.

But there's a way to categorize all this and to understand the value proposition of doing this in the most efficient, data-driven way. In the washroom environment, some simple pain points can be monitored and reported to ensure that key stakeholders know when an issue arises and can respond effectively and promptly.

Key constituencies, typical commercial washroom



- **Suppliers of products and appliances,** such as paper towel dispensers, soap dispensers, hand dryers, hygienic bins, etc.
- **Cleaning service providers** who staff the cleaners and janitors whose job it is to maintain cleanliness and typically refill the above dispensers with fresh supplies
- **Building managers** who hire cleaning service providers and want to provide the best experience to their users, managing suppliers through service-level agreements
- **Users of the washrooms** who expect them to be cleaned and supplied, and if they ever have to communicate feedback or report issues, want their privacy and anonymity preserved
- **Local staff,** in many smaller outlets like restaurant or coffee chains and roadside service stations, may have direct responsibility for keeping the washroom well maintained

Suppliers of products and dispensers

There are plenty of differences when it comes to washrooms around the world, but we can all agree on expecting the following to be in them:

a) toilet paper in the cubicles

b) soap and water for washing one's hands

c) some way of drying one's hands

d) bins to dispose of waste

e) disinfecting products used regularly to prevent germs and viruses from lingering

In commercial buildings, all the necessary supplies are generally provided in bulk by a few large companies. These same companies also typically supply a range of dispensers of these products as well as associated services, such as refilling or maintenance.

Some of these companies have been around for decades or even centuries and have been very successful in developing efficient supply chains, better products and distribution networks.

> *The next challenge is which part of the washroom is best to connect?*

Without being exhaustive, a list of such suppliers would include the likes of Georgia-Pacific (USA), CWS (Germany), Elis (France) and Rentokil Initial (UK).

When these suppliers started thinking about making the washroom smart, their instinct was naturally to make their supply and distribution chains even more effective through better usage data. And for a soap manufacturer, what better way to have better data than to have a connected soap dispenser which reports regularly how much product has been used/is left in the dispenser? If all your clients have connected soap dispensers, you can produce and distribute only the soap that's necessary, eliminating excess storage and the guesswork of when to refill.

The next challenge is which part of the washroom is best to connect? The soap dispensers? The paper towel dispensers? The waste bins? What about leak detection to prevent water wasted? Or all of them?

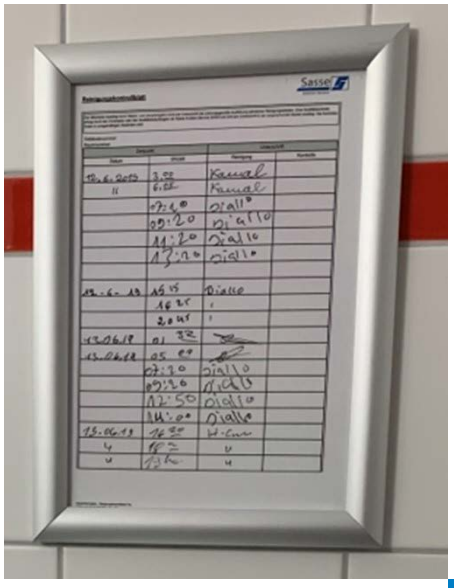
The final issue with that idea is that making dispensers or bins smart does not come cheap, and the benefits are too one-sided for manufacturers. It's typically difficult or even impossible to retrofit connected technology to existing dispensers, so manufacturers have gone down the long and costly R&D road of designing their own connected dispensers. Several factors come together to make the result expensive:

- Most of these companies do not come from a heavy IT/data focus in their product development (unlike, say, banks or insurers which have been relying on data as their core competency for decades), so they must learn a whole new world of both hardware such as micro-controllers as well as software, on the edge (the embedded application running on the connected devices) and on the cloud and in app stores for end users.
- IoT connectivity standards are still a minefield: Should we use Wi-Fi? Or a SIM card? What about these new Low-Power Wide Area Networks? How do we ensure data security and integrity whilst keeping it simple for end customers to install and use?
- Manufacturing costs are directly related to volume effects. If you build prototypes or small batches, the costs are too big for customers to accept innovation. If you build large volumes to drive critical mass and lower individual cost, you carry the whole risk of inventory.

With the above issues, it's not surprising that most suppliers' smart washroom strategies and products are still in their infancy or that adoption of connected dispensers is generally low. It also appears that most of the benefits of the connected dispensers are with the suppliers whilst the customers are the ones who are supposed to bear the cost of the new technology.

Cleaning service providers

Cleaning service providers are the companies that recruit, train and staff the crews charged with cleaning buildings generally and washrooms specifically. Some are part of larger facilities management (FM) teams and some specialize in only cleaning. They rely on a large human workforce of unskilled labor taught to operate according to industry best practices. Cleaning service providers typically tender for the exclusive business of the building managers on a multi-year basis. As the service is generally considered undifferentiated, the tenders are typically won based on cost, which means most cleaning service providers have very low operating margins. They also need to demonstrate compliance with the service levels demanded by their customer in the tender. This is generally done by way of reporting on service delivery, a big part of which must be compiled manually.



The low margins and unskilled workforce do not generally make for a hot bed of innovation. It is difficult, if not impossible, in these organizations to find people with budgets for R&D which would enable new ways of working or a more data-driven approach. Suppliers or industrywide best practice sharing have traditional driven innovation.

However, we have found these companies to be the most receptive to the opportunity to enable smart washrooms…for various reasons:

- First and foremost, to win more business and increase their revenue. In a generally undifferentiated market, suppliers who come with innovation have more chances of winning against traditional competitors.
- Second, to boost productivity: With the right data, cleaners can start cleaning intelligently, i.e., clean more often the areas that get a lot of use and clean less or not at all the areas that are less used or not at all used. Data-driven cleaning, especially in uncertain return-to-office patterns, makes a lot of sense economically for cleaning companies.
- Finally, to digitalize the reporting: With simple IoT tools, the antique paper signature sheet can finally be relegated to the history books where it belongs. Automated attendance reporting frees cleaning managers from mundane data entry on a weekly basis, giving them more time to attend to more useful tasks.

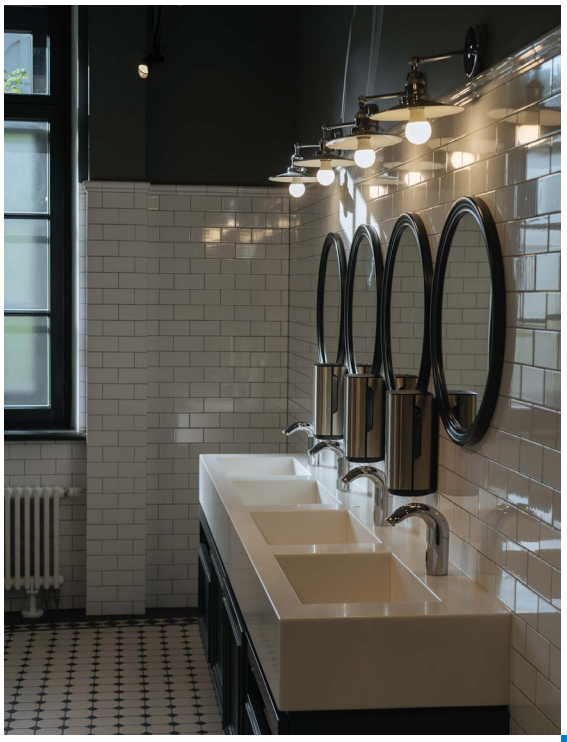
The smart washroom from the point of view of the cleaning suppliers is all about recording and analyzing traffic patterns to clean on demand and being alerted to requests to provide the service users are expecting.

Building managers and local staff

Building managers, whether they be tenant-occupiers or landlords, are primarily concerned with their compliance with legislation and the experience they give to users of the buildings, whether they are customers, employees or visitors.

So, when it comes to washrooms, the main concern for building managers is that the aforementioned suppliers are doing a good job of providing the right supplies in the right quantities, and the service providers are delivering on their promised service-level agreements (SLAs).

A smart washroom for a building manager is usually one which keeps track of both the satisfaction of users as well as the performance of their suppliers. This explains the appearance globally of connected feedback devices, which ask users to rate their level of happiness with the facilities they've used, typically using between three and five "smiley faces". These devices anonymously capture the washroom users' sentiments and allow the building manager to have an independent opinion of the service delivery of its suppliers.



Washroom users

Availability, visible cleanliness and available supply of everything that's needed summarize the expectations of washroom users. And when there's a problem, being able to easily and anonymously report it to the right person to fix it fast.

Availability is generally visible at short range based on the locked/not locked status provided by most washroom doors. However, in large areas as well as in tight spaces like airplanes, smart technology is now available to visibly and from afar show whether a space is available to facilitate the flow of people and avoid excessive queuing in front of a busy washroom.

Visibility of the cleanliness is one reason why most washrooms display a piece of paper on the wall with a record of when the place was last cleaned. By

posting the regularity of the cleaning schedule and hopefully showing someone recently attended to the facilities, users can see for themselves what a good service the cleaning supplier is delivering. Other senses are also appealed to, notably the sense of smell, as products are designed to convey that "smell of clean".

The need for availability of supplies is obvious. Nothing is more irritating to a user than finding there's no soap left, or no toilet paper or no way to dry one's hands, except perhaps finding that there's no easy way to report it to anyone. It is still common in washrooms to have absolutely no communication method between users and service providers. Sometimes, a poster indicates a phone number, but it's often an internal extension rather than a number everyone can call, and let's face it, who wants to get their phone out straight after using a washroom. And face a potential long call to explain to a stranger that certain supplies are missing with no real chance of knowing if they will get replaced? The barrier is just too high and the rewards too small, so people remain frustrated and do not bother to report anything in these situations.

This is where feedback buttons and more interestingly service request buttons come into their own. A simple push to indicate either that something is not right ("I'm not happy" button) or, better still, report that something specific needs doing ("Water on the floor", "No soap", etc.) is where smart washroom technology really delights washroom users. At Microshare, we've deployed tens of thousands of service request buttons all over the world. We have observed that washrooms users like to report problems or satisfaction with a simple push, anonymously and in full privacy over any other method. Our experience deploying a QR code-based touch-free solution alongside our push buttons at the beginning of the pandemic has further confirmed that love of push buttons over other methods. Only 0.6% of all the hundreds of thousands of requests we've processed were done using the QR code; the rest used push buttons.

We've also found that offering an easy method for anonymous users to report issues, much like Waze allows ordinary drivers to report an accident they see on the side of the road, is the most cost-effective method to drive better washrooms.

Conclusion: The universal Smart Washroom solution

The desire for clean, well-supplied washrooms is universal. But as we've seen above, each constituent in the washroom value chain has different expectations for smart washrooms. When summarized in a simple table, however, we see more commonality than first expected:

Group	Want	Smart washroom tech
Product and dispenser suppliers	Usage data	Connected dispensers
Cleaning service providers	Traffic data Service requests SLA reporting	Occupancy sensors Service request buttons Attendance logging
Building managers/local staff	Quality check Space utilization	Feedback buttons Occupancy sensors
Washroom users	Availability Feedback	Occupancy sensors and visible indicators of free/occupied Service request buttons

Whilst specialized solutions such as connected dispensers or visible free/occupied indicators will only be deployed in specific cases, there are two common threads across all groups: wanting to know how much and when the washrooms are utilized and a method that allows for easy communication of service requests and feedback to measure service quality.

This realization and the universal desire for clean, well-stocked washrooms are the founding idea behind Microshare's EverSmart Washroom. By measuring in real time and comparing traffic data across washrooms, we can enable product suppliers to better forecast how many supplies will be needed. Cleaning service providers can organize their routes in more efficient way, and building managers can understand how their space is utilized. Similarly, offering an easy method for users to report both the issues they notice and congratulate the staff on a job well done enables both the service provider to respond more accurately and the building manager to monitor the performance of their suppliers.

We work with all groups in the value chain and hope we can contribute in our own little way to making a universal goal a little bit smarter.

Charles Paumelle is Chief Product Officer and a Co-Founder of Microshare, a leading Smart Building data provider and maker of EverSmart Washroom and other transformational products.

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