

# Home & Hygiene: three innovation drivers and the air quality opportunity

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Driven by a change in consumer behaviour resulting from the Covid-19 pandemic, from surfaces to fabrics to personal cleansing, sales of hygiene products continue to grow. How can innovation teams make the most of this opportunity? Principal Consultant Cesar Vargas-Razo highlights three trends currently driving the reinvention of traditional hygiene products and explores the fast-evolving sub-category of air quality.

What do consumers and commercial users want from hygiene products in the post-pandemic world? The sudden upsurge in sales spurred by COVID-19 may be levelling off, but global growth is projected to continue at 3% to 5% yearly, whereas before the pandemic growth was slower (see Figure 1). This presents an opportunity for hygiene category players to gain new ground and increase market share.

### Sales of Surface Care Products (one example within Home and Hygiene)

Retail Value RSP - USD million

**25,729 in 2021**

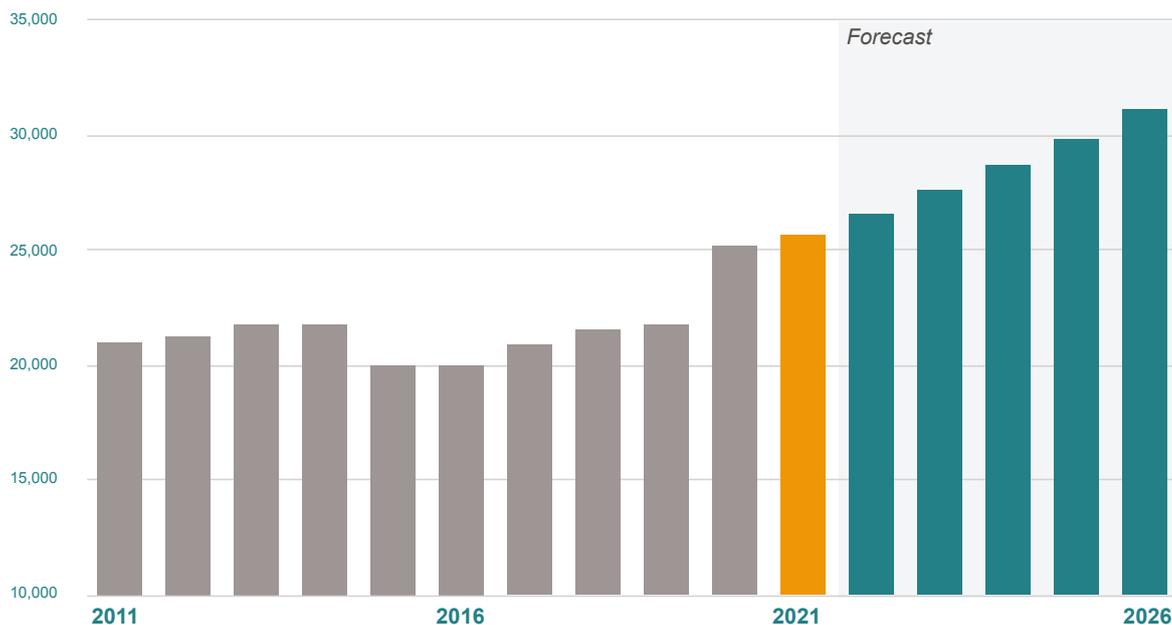


Figure 1: Historic and Forecast Sales of Surface Care Products<sup>1</sup>

## What's happening in hygiene?

In this white paper we drill down into three interconnected trends and concerns shaping demand for hygiene products. While these drivers were already evident in the pre-pandemic world, they have evolved in interesting ways and innovation strategies rooted in them could yield significant returns. There are opportunities to adapt, improve or re-imagine products in laundry care and hard surface cleaning, while the air quality sub-category offers exciting prospects for breakthrough innovation and leadership.



## Three major drivers of hygiene innovation

- 1** The undesirable/ time consuming nature of the cleaning chore
- 2** The need for proof of claims (is it really working?)
- 3** The importance of transparency (is it harmful?)

In mid-2021, when the **US Centers for Disease Control** and other health authorities declared that COVID-19 transmission is predominantly airborne (not via contaminated surfaces), sales of traditional cleaning products didn't immediately normalise. Growth did eventually ease in 2022 when the cost-of-living crisis and the repercussions of war in Europe diverted consumers' attention away from the pandemic. However, many health authorities and commentators predict that COVID-19 and other communicable diseases will persist as a key concern for some time<sup>2</sup>. This applies to consumers protecting themselves and their families at home and on-the-go, as well as those who need to ensure people feel safe and protected in commercial or public spaces.

### 1. The undesirable nature of the cleaning chore

There's no escaping the fact that cleaning is a grudge activity. In the home environment, a superior hygiene experience is one that is simple, fast, and required as infrequently as possible. It's a similar story in commercial or public settings where cleaning is a resource intensive and expensive process<sup>3</sup>.

Hygiene product manufacturers have long understood this sentiment. However, today it goes hand-in-hand with a heightened desire to ensure cleaning is effective. People want maximum safety and protection, for minimal time and effort. New products that reduce the burden of cleaning while providing maximum efficacy are set to strike a chord with consumers and facilities managers alike. The best of these solutions will combine time-efficiency with cost-efficiency without compromising efficacy (i.e. overall convenience) to present an offering that is hard to resist<sup>4</sup>.

Developing 'just enough' and 'just in time' approaches to guide how and when cleaning products are used can address all these goals. One way of achieving this is through use of technologies that indicate when a surface requires cleaning. Automation can take these capabilities further, either providing alerts to eradicate the need for routine hygiene checks, or enabling some aspects of cleaning to happen without the need for human intervention.

So, where should the R&D and innovation teams of hygiene product companies focus their efforts? It's important to be mindful of end users' changing expectations and requirements, especially at a time when premium branded products could be overlooked for cheaper alternatives. Consumers and commercial buyers alike need to be persuaded that branded products represent superior value. The time is right to build on the notion of 'clean equals safe' with products that offer broader benefits and differentiators.

Technical solutions in this vein avoid unnecessary cleaning and reduce wastage without compromising hygiene standards. Clean areas can be left alone while dirty areas receive the attention they need. This allows the window of time between cleans to be managed responsively and intelligently rather than via routine-led approaches.

In commercial and public environments cleaners and facilities managers might undergo dedicated training in the use of technologies to enable smarter cleaning strategies. However, for consumer products the emphasis must be on ease of use. It's no good halving the time spent cleaning if it takes just as long to figure out whether an area is dirty. So, while there is scope for complex dashboard solutions in commercial settings, a simple red/green indicator is more useful for consumers at home.

## 2. Develop and apply an empathetic design process

### 2. The need for proof of claims

Solutions that assess whether cleaning is required can play a dual role, also offering reassurance that a target area or item is clean. This aligns with the core 'safe and protected' requirement for cleaning in the home and public or commercial spaces.

As highlighted in a recent **HBR** article<sup>5</sup>, a 2021 survey of 1,000 consumers showed that while more than 80% consider trust important when deciding what product to buy, only 34% trust the brands they use. One can argue that this changes depending on age or other socioeconomic factors, but there is no denying that trust is in short supply.

Traditional reason-to-believe statements such as 'scientifically proven' or 'contains unique technologies' remain powerful with some, but not with everyone. Substantiating such statements with robust laboratory or consumer trials and referencing the results on the product can take things one step further. If these trials achieve standards that satisfy regulatory requirements, results should have the power to counter most buyers' scepticism.

The need to prove claims doesn't apply to product efficacy alone. Products must also consider the 'just enough' and 'just in time' ethos mentioned above. Understanding how often cleaning should happen to achieve the optimum level of hygiene, using the minimum amount of chemical formulations, will enable avoidance of overuse and overexposure.

Similarly, we are likely to see a shift away from the phenomenon of products which claim to be 99.99% effective against bacteria. Regulators' activity will have a role to play here as steps are taken to mitigate the risk of increased bacterial resistance to antimicrobials, which is partly driven by the unnecessary overuse of medical-grade antimicrobial agents. In many applications, lower levels of efficacy are perfectly adequate, but there may be a need to educate product buyers on this matter. There are opportunities for brands to take a leadership stance here, changing the emphasis of product positioning and claims before it is mandated.

Devices will also be part of this shift, either complementing or replacing the use of chemical formulations. Sensor technology is poised to be a critical enabler in this space, alongside more sophisticated techniques such as spectroscopy. An early example is the **Dyson V15 Detect** vacuum, which uses a piezoelectric sensor to count and measure the size of dust particles so that suction power can be adapted accordingly. The device also incorporates a visual display summarising the quantity and size of particles collected, down to 10µm. Highlighting the product's ability to clean beyond what can be seen with the naked eye offers enhanced proof of the cleaning claims, especially by focusing on particles such as pollen which may trigger allergies and asthma. We anticipate a great deal of innovation in this arena. The ability to convey effectiveness in a way that resonates and is easily understood will be key, especially for in-home consumer applications.

### 3. The importance of transparency

Closely related to the desire for trust in claims is the need for greater transparency. For many users this encompasses factors such as chemical use and the potential impact on humans and the environment.

Many users are already conscious of the environmental effects of hygiene products at point of use or point of disposal, in terms of chemicals rinsed down the drain, product packaging, or devices that have reached end of life. Increasingly, users also want to know more about sourcing and manufacture, asking questions like 'is this product sustainable?' or 'does it include petrochemicals?'

There's an appetite for more natural active ingredients or alternative approaches to cleaning that are just as effective but pose less risk of harm to the environment. And yet, alternative and natural sources of chemicals are under the spotlight too. Ingredients derived from crops such as palm oil or soybeans present their own challenges, from loss of habitat for wildlife or the depletion of land used for local food production. These are complex issues, and a brand seeking to do the right thing could easily find itself doing more harm than good, possibly leading to a public backlash. It's so important that innovation is underpinned by due diligence and reflects a detailed understanding of the intricacies involved.

Circular economy and alternative strategies provide a rich source of innovation. **Veles** in the US has successfully isolated organic compounds and water from food waste to make chemicals and ingredients for use in an all-purpose cleaner. **Amyris** also offers chemicals and products for personal hygiene sourced from biotechnology. Investigating alternatives to 'harmful' chemicals or new ways to source scarce ingredients might reveal interesting ways to improve on traditional cleaning products.

Embracing these challenges and turning them into opportunities requires a different way of thinking about product development. Importantly, this can be facilitated through the adaptation of existing processes and procedures, it doesn't necessarily require new ones. For instance, traditional design thinking parameters which ensure a product is 'desirable, viable, feasible' can be extended to encourage a broader frame of reference: 'desirable & inclusive, viable & sustainable, feasible & trustworthy'.

Our dedicated paper on *Responsible Consumer Innovation* looks at this in greater detail, download it from [www.sagentiainnovation.com/insights/responsible-consumer-innovation/](http://www.sagentiainnovation.com/insights/responsible-consumer-innovation/)

# The air quality opportunity

Air quality holds great potential to address the above trends and concerns across a wide range of domestic and commercial applications, in a category expected to expand at a CAGR of 8% to 10% globally<sup>7</sup>. As well as targeting bacteria and airborne viruses, products need to be effective against larger suspended particulates including dust, pollen, and mould spores. Gaseous pollutants such as volatile organic compounds, carbon monoxide and nitrogen dioxide can also be targeted.

## Air quality device technologies

**Ultraviolet-C (UV-C) light** – lamps emitting UV-C have a long history of use in air treatment applications. They can be used to irradiate the upper portions of air in occupied spaces or to provide complete irradiation in unoccupied spaces. They can also be used to treat air that passes through a confined space, for instance within a device.

**Blue light** – considered an emerging technology for air treatment, this poses lower risks to humans than UV-C light.

**Air ionisation** – this established method of air treatment has been shown to reduce airborne particulates, contaminants and allergens. A newer format, known as bipolar or needlepoint ionisation, is emerging as a potential way to remove viruses from ambient air.

**HEPA filtration** – while this technique is traditionally used in the filtration of particulates, more recent industry testing has focused on its potential use against airborne droplets. It can also be used in combination with techniques such as air ionisation or UV-C. However, multi-method devices can pose a higher level of regulatory complexity.

**Ozone generation** – self-contained ozone generation units have been positioned as a ‘safe and natural’ way to ‘decontaminate’ air. However, they are currently the subject of intense scrutiny from the **US EPA** which has found from the available scientific evidence that, at concentrations that do not exceed public health standards, ozone is generally ineffective in controlling indoor air pollution.<sup>7</sup>



## So, what are the key considerations for effective product development in this space?

Air quality encompasses aerosol or spray treatments, devices which clean the air via physical means (see the 'air quality device technologies' section), and combination products which use both techniques. It's less labour-intensive than hard surface cleaning and the technologies are amenable to automation, so they can be triggered as needed to keep target areas safe. These inherent benefits mean air treatment could offer exciting ways to reduce the burden of cleaning and address the 'undesirable' innovation driver. However, it's important to think holistically.

For instance, the development of an air treatment device using filter technology needs to account for potential microbial growth on filters as well as the ease, expense and frequency of replacing or cleaning them. This has repercussions for the 'undesirable chore', 'proof of claims', and 'transparency' drivers: How effective are they really? Is it unpleasant or even unsafe to handle the filters? Is changing them a difficult or time-consuming process? And what are the filters made from, are they reusable or recyclable?

Satisfying the 'proof of claims' driver is especially complex, both in terms of proving efficacy and demonstrating safety. Providing real-time evidence of effectiveness may require dedicated innovation alongside core R&D for the air quality process itself.

Much progress has been made in air quality monitoring technologies. In-home examples include **Dyson's** range of air purifiers, such as the *purifier cool* autoreact which claims to capture dust, allergens and the H1N1 virus. **Viologen** is a major player in the commercial space, with its HEXAgone range of UV-C sterilisers.

It's feasible for an air treatment device to incorporate built-in sensors and indicators. Measuring levels of CO<sub>2</sub>, fine particles or VOCs is relatively straightforward, but sensing viral presence is much more challenging. One way around this could be to establish proxies that are more easily sensed and measured if the target pollutant can't be measured directly.

Devices that treat air internally hold great potential. They avoid the need to release an active physical or chemical agent into the air, which may be preferable for people with respiratory conditions. This approach also negates the need to vacate the space for a period of time during and after treatment when toxic chemicals or high-risk techniques are used. However, there are numerous design challenges to consider. Firstly, it may be difficult to ensure sufficient air circulation through the device. As well as impacting the design, this might require strict guidance on where devices are placed or the spacing of multiple devices in larger areas. It's also vital that the device cannot cause risks by emitting or releasing treatment entities such as UV-C light, ozone or formaldehyde unintentionally.

Technical considerations like these are just one part of the equation; the regulatory landscape is also difficult to navigate. In the US, pesticidal devices are regulated by the **Environmental Protection Agency (EPA)** whereas an air purification device intended to 'kill pathogens/microorganisms in the air by exposure to UV radiation, removal through filtration, or electrostatic precipitation,' would be classified as a medical device and therefore fall under the jurisdiction of the **Food and Drug Administration (FDA)**.

Applying a regulatory lens to the front end of innovation can streamline the journey to market, mitigating the risk of protracted authorisation or the need for costly revisions at a late stage. A joined-up, multidisciplinary approach focused on efficacy, evidence and compliance can accelerate progress and boost the chances of securing first-mover advantage with air quality solutions.

## Cleaning up in hygiene

The drivers outlined in this paper offer new perspectives for innovation in traditional hygiene sub-categories such as laundry care and hard surface cleaning, and even personal 'care/cleaning'. There are many opportunities to improve and reposition products for greater appeal to consumers and / or commercial users.

Alongside this, the air quality category is ripe for extension and innovation that could transform the way people clean. The development of safe, effective and compliant air quality solutions that meet user demands is no mean feat. Nevertheless, while the challenges are great, we believe the scale of the opportunity warrants the investment of time, resource and innovation budget. As sales in the hygiene category continue to grow, players which extend and enrich their portfolios with user priorities in mind are set to thrive.



## How Sagentia Innovation can help

We bring technical expertise and experience in cleaning and hygiene products and services for the consumer, medical and industrial sectors coupled with capabilities for the assessment of the market opportunity and also strategic partnerships. This puts us in a strong position to illuminate the path towards innovative technical solutions that consider the consumer / user experience, ensure confidence in the claims made and carefully consider and steer away from potential risks to users and the environment.

In recent years we have worked with a variety of partners to assist in identifying solutions for design challenges where end-user convenience and simplicity are key for success, either in terms of core product performance, or by considering how a product and device work best together. And beyond our advisory research and product development services, our access to regulatory expertise within the Science Group family of consultancies enables us to consider upfront any challenges for market commercialisation.

The opportunities to innovate in cleaning and hygiene are massive, and careful consideration of what it takes to compete and win will provide innovators with far-reaching advantages.



## About Sagentia Innovation

Sagentia Innovation provides independent advisory and leading-edge product development services focused on science and technology initiatives. Working across industrial, chemical, energy, food and beverage, and consumer markets, Sagentia Innovation works with start-up disruptors through to world leading brands to extract maximum value from R&D and innovation investments.

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