

Research Article

Teaching and Learning Innovation in Management of Technology and Innovation: Cleanova

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Abstract: Cleanova is an innovative multifunctional cleaning device that combines sweeping, mopping, spraying, UV sterilization, and cobweb dusting into one compact and user-friendly tool. Its modular design features interchangeable heads that securely click into place, allowing easy function changes while maintaining durability and lightweight handling. Powered by solar-charged UV-C technology, Cleanova provides an eco-friendly way to eliminate bacteria and viruses without harsh chemicals. Its ergonomic design supports elderly users and caregivers by reducing physical strain and improving access to corners. With a modern black and neon blue finish, refillable water tank, and built-in squeegee, Cleanova enhances cleaning efficiency, hygiene, and sustainable living.



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1. INTRODUCTION

In today's fast-paced environment, consumers seek more efficient, hygienic and space-saving solutions that align with both functionality and aesthetics. The idea of Cleanova was indeed sparked by our daily struggle with using too many cleaning tools at one time. Cleanova is indeed not just another cleaning tool as it is a bold reimagining of what a cleaning tool can be. It combines all, includes sweeping, mopping, cobweb dusting, water-based cleaning, and UV sanitization into a single, compact device merging the conventional practicality with smart innovation. Cleanova is intended to be both useful and visually appealing with its modern interface, black neon blue accents, and clean lines. It is more than a tool as it is a lifestyle product that solves major problems of cluttered cleaning solutions, time consumption, and hygiene inefficiencies.

As per the logo itself, the standout round “O” with glossy gradient resembles a water droplet or bubble symbolising hygiene and cleanliness. The modern sleek font represents innovation simplicity, aligning with Cleanova’s multifunctional design and user-friendly nature. The colour scheme, mainly blue, white, and violet, reflects trust, modern living, and purity. The tagline “Compact Clean, Every Surface, One Tool” clearly communicates the all-in-one functionality and space-saving appeal of Cleanova, especially for those in urban areas.

Most available tools focus only on mechanical cleaning by sweeping and mopping without addressing the bacterial or viral contaminants that remain on surfaces. Cleanova introduces UV-C light sanitization, a scientifically proven method for eliminating germs directly into the cleaning routine. This blending of sterilizing and cleansing places Cleanova at the forefront of hygiene technology.

Cleanova also takes space limitations into account. The majority of consumers, especially urban apartment or communal housing dwellers, simply do not have the room for large storage spaces. Having specialized tools for each type of cleaning not only takes up living space with clutter but also contributes to cost and environmental waste. By combining a number of tools into a single appliance, Cleanova reduces the need for frequent trips to the store and helps prevent plastic waste generated by conventional disposable mop heads, cleaning sprays, and wipes.

Another key feature of Cleanova is its ease of use. It is light, portable, and easy to maneuver, and hence suitable for elderly people, physically handicapped individuals, and those who consider standard equipment too taxing. The device includes small, clearly marked buttons to control core functions such as the water spray and UV sterilization, allowing users to activate features with a simple press.

The concept of Cleanova clearly shows a sensibility for modern living, including compactness, hygiene consciousness, eco-friendliness, convenience, time economization, and effective gadgets. In future developments, Cleanova also aims to offer customizable attachments, a dedicated app, and smart-home compatibility to further enhance the user experience.

Cleanova is indeed not merely an invention, as it is an innovation specifically designed to meet the needs of the present time. It transforms cleaning from a tiring routine into a high-tech, helpful part of daily life. Through its multifunctionality, technological advancement, and minimalist design, Cleanova gives us a peek at what a smart home of the future will be like.

2. LITERATURE REVIEW

The rise in demand for modern lifestyle has changed how people approach household chores, especially in cleaning (Cleaning Appliances Market Size, Growth, Forecast, 2033). In Malaysia’s fast-changing urban environment, keeping our homes clean and hygienic has become more important than ever. Yet, when we look at the tools we still use every day, like brooms, mops, squeegees, spray bottles, feather dusters, and cobweb dusters, they have not really changed much in decades. Most households are still relying on a collection of single-purpose tools to get through basic cleaning tasks. This not only takes up space and time but also makes cleaning more tiring and less efficient. The main issue is that traditional cleaning tools are built to do just one thing. So, to clean an entire room, one might have to sweep, then mop, spray a surface with disinfectant, and then climb up or stretch to reach a dusty corner. Switching between different tools like this takes a lot of effort, especially for older adults or anyone with limited mobility. Furthermore, the acquisition and storage of various tools accumulate significant expenses as well as contribute to clutter.

Another big concern is space, especially in urban residential areas. The Department of Statistics Malaysia (DOSM) indicated that in 2023, there were over 6.2 million residential units with apartments and condominiums, making up 17.2% of that number (DOSM, 2023). In 2024, over 106,000 new homes were added, a large part of which were high-rise units defined by limited storage space (Global Property Guide, 2024). For families who live in these tight spaces, the need to house cleaning tools like brooms, mops, spray bottles, and other equipment quickly becomes a source of frustration, contrary to the tidy, minimalist lifestyle that most Malaysians wish to have.

Next, hygiene. Since the COVID-19 pandemic, we are all more conscious of germs, viruses, and just how vital surface cleanliness is. The reality, though, is that most conventional tools wipe away visible grime only if they do not sanitize. One study from the Malaysian Journal of Public Health Medicine even detected SARS-CoV-2 on household surfaces, which indicates that cleaning without disinfection leaves behind risks (MJPHM, 2021). On top of that, overusing chemical sprays can affect air quality and may be harmful in homes with children, pets or elderly residents. This is where UV-C technology comes in. Malaysia's market for UV disinfection is forecasted to grow at a compound annual growth rate (CAGR) of 7.7% between 2025 to 2031, according to 6Wresearch. According to Desye (2021), with the rise of infectious diseases and increasing awareness of surface hygiene, especially after the global COVID-19 pandemic, the demand for disinfection and sterilization tools has surged (Desye, 2021). However, most cleaning tools on the market today do not come with built-in UV sterilization, especially ones that are affordable for everyday users.

Lastly, it is indeed physically tiring to keep switching tools, bending down, scrubbing, and lifting equipment. For those who are recovering from injury or older, this makes cleaning an actual struggle. This is important in Malaysia, where 11.6% of the population is aged 60 and above, while in 2024 projected to reach 17.3% by 2040 (DOSM, 2024; The Malaysian Reserve, 2023). Economically, needing to continually replace worn-out mop heads, broken spray nozzles or cracked plastic tools adds up to monthly costs, not to mention the environmental waste from all those disposable components.

According to Gøthesen et al. (2023), the rise to a wave of home innovations is indeed coming from the desire for minimalism, convenience, and smart technology integration by the users, and among them includes multifunctional devices that combine several tasks into one streamlined tool. Thus, an all-in-one solution that actually stays abreast of contemporary needs is precisely the void that Cleanova seeks to occupy. It is a sleek, multifunctional cleaning tool that rolls sweeping, mopping, spraying, cobweb dusting, and UV-C sterilization into a single, convenient device. It is a time-saver, a clutter-reducer, and above all, it makes cleaning safer and more accessible for all.

3. METHODOLOGY

Cleanova is an intelligent, one-stick cleaning device designed to rectify the inefficiencies of the conventional home cleaning process. Cleanova is a single piece of equipment into which sweeping, mopping, squeegeeing, UV sterilization, and cobweb dusting have been integrated into a single straightforward-to-use device. Cleanova has a high-tech, aerodynamic appearance with neon blue trim and a digital control console and represents a radical departure from conventional cleaning equipment that not only performs but also looks stunning and is convenient to use technologically.

Essentially, Cleanova was created to reduce the need for multiple cleaning devices by summing up five basic cleaning operations in a single space-efficient stick-type device. Its modular configuration allows easy replacement of attachments at will depending on the type of surface or task being done. From dusting off dust and dirt to wiping away spills or cobwebs off ceiling corners, Cleanova makes it possible for one to do so without having to switch tools completely.

The device's base consists of a removable and washable mop head made from high-absorbency microfiber material. It is suited for wet mopping and squeegeeing of surfaces like hardwood or vinyl floors and tiles. It is simple to integrate with an in-built water tank that holds a capacity of up to 150 ml of cleaning solution or regular water. An in-line spray nozzle atomizes water uniformly with a trigger on the handle that does away with buckets or other spraying tools. For added convenience, the water tank may be detached when not in use, leaving the Cleanova stick light and easy to handle.

Cleanova's broom head module has soft, anti-static bristles for gentle removal of dust and light debris on carpets and hard floors. The twist-on/twist-off broom module is locked into position with a twist-lock system, ensuring safe attachment in use and easy interchangeability. A dusting device with a spider web duster made of durable nylon fibers is attached to an extendable arm that can reach up to 1.5 meters above ground level to allow users to dust corners, walls, and ceiling fan blades without the use of a step stool or ladder.

Perhaps the most notable enhancement in the Cleanova is its built-in UV-C sterilization module. UV-C radiation, with a wavelength of 200–280 nm, is proven to kill microorganisms such as bacteria, viruses, and fungi by shattering their DNA/RNA patterns. The UV-C emitter is placed ideally just beside the mop head and powered with an electronic control switch on the upper portion of the handle. This enables concentrated surface sterilization during mopping.

Powering the device is a removable lithium-ion battery pack designed for high energy density and lightweight performance. The battery offers a functional lifespan of approximately 90 to 120 minutes of run time per full charge and draws inspiration from the modular design aesthetic present in cordless drills. To provide the best weight distribution and handling, the battery remains connected only when the UV-C functionality is required. Recharge is facilitated through a USB-C outlet for universal usage with standard mobile recharging equipment. The handle unit has an ergonomically shaped profile with a soft-touch finish to minimize user fatigue and maximize comfort through extended use.

Every design element of Cleanova emphasizes convenience, hygiene, and simplicity. The modularity allows for compact storage, the multifunctionality reduces household clutter, and the smart features make cleaning not only easier but also more effective. In the realm of modern household invention and innovation, Cleanova positioned itself as a standout product for its sturdy, long-lasting design, efficient performance, and sustainable environmentally friendly materials.

4. FINDINGS

4.1. *Functional Specifications of Product Innovation*

Cleanova stands as a fully integrated, multifunctional cleaning system engineered with a comprehensive set of technical and functional specifications that make it both a cutting-edge design and user-friendly. This section discusses the primary functional components of the product, such as modular structural design, compact form factor, in-built cleaning mechanisms, in-built removable lithium battery power source, and functionality for convenient storage. Each aspect of Cleanova has been carefully designed to maximize efficiency, ease of use, and hygienic effectiveness while maintaining ergonomic and aesthetic appeal.

4.1.1 *Modular Cleaning Attachments*

Cleanova's standout feature is its ability to function as five distinct cleaning tools in one device through interchangeable attachments. These include (1) broom head, anti-static bristles for dry cleaning

and debris collection; (2) microfiber mop, high-absorbency, washable, and replaceable mop pad for wet cleaning; (3) squeegee blade, designed for smooth surfaces like glass, tiles, and laminate flooring; (4) spider web and feather duster, flexible bristle head on a telescopic pole for high-reach cleaning.

Each module uses a twist-lock or magnetic click-in system that allows users to switch tools easily without disassembling the entire device. This modularity also enables compact storage and easy maintenance.

4.1.2 UV-C Sterilization Module

Cleanova incorporates a UV-C light emitter situated near the base of the mop attachment. UV-C wavelengths (typically between 200–280 nm) are known to effectively eliminate up to 99.9% of bacteria and viruses on hard surfaces. This sterilizing component activates only during contact with the floor for safety, deactivates when the unit is lifted to prevent accidental exposure to the eyes or skin, and uses a low-power but high-efficiency UV-C diode rated for 10,000 hours. This feature distinguishes Cleanova from conventional cleaning tools, adding a layer of disinfection that does not require chemical sprays or wipes.

4.1.3 Built-in Water Tank and Spray System

Cleanova features an integrated 150ml water tank located inside the shaft. A pressurized spray nozzle at the mop head disperses water or cleaning solution evenly across the surface. The spray can be controlled via a trigger button on the handle. The tank is detachable, refillable, and made of BPA-free, food-grade plastic to ensure safety and durability.

4.1.4 Power Source and Battery

Cleanova operates on a rechargeable lithium-ion battery (7.4V, 2600mAh), which offers 90 to 120 minutes of continuous use, a full recharge time of approximately 2.5 hours via USB-C charging port and overcharge and short-circuit protection circuits are built into the battery pack. The battery pack is replaceable and securely housed in a water-resistant compartment.

4.1.5 Materials and Durability

Sustainability is the core of Cleanova's design. The Smart Broom is constructed from EcoSmart materials that include aerospace-grade aluminum and up to 60% post-consumer recycled plastics. These materials reduce environmental impact without sacrificing strength and durability. All materials are also non-toxic and BPA-free, making them safe to use in homes with children or pets.

Cleanova's modular components are also replaceable, making it easy to achieve long-term use and limit waste. Produced in low-carbon, energy-efficient factories, Cleanova is more than just a cleaning product but it's a step towards a cleaner world. The mop heads are made from flexible polymers and microfiber fabrics, with the handle grip made by Thermoplastic rubber (TPR) for anti-slip comfort. The product is designed to withstand regular domestic use and is certified under basic IPX4 water resistance (splash-proof).

4.1.6 Safety and User Accessibility

The comfort and safety are Cleanova's utmost concern. The Smart Broom is built with smooth, skin-safe material and pressure-sensitive buttons for effortless use for anyone at any age. It is lightweight, ergonomically designed, and features auto-locking heads for prevention of mishaps and misuse. Cleanova is built using high-strength aerospace-grade aluminium alloy, which is strong yet ultra-lightweight, weighing less than 1kg. The use of advanced material reduces manoeuvrability effort

significantly, particularly for the elderly and those with restricted mobility, without sacrificing structural stability or performance.

4.1.7 Additional Features

Cleanova is designed not only for compact cleaning with one tool but also for smart living. Its sleek magnetic wall mount uses powerful neodymium magnets to let users snap the broom into place effortlessly, no hooks or clips needed. The mount offers flexible installation options including drill-free adhesive or screw-based mounting, making it ideal for both renters and homeowners. With a slim profile and ventilated grip design, it keeps the broom accessible, secure, and dry without taking up valuable floor space, perfect for compact urban homes like apartments nowadays. It shows more practical uses.

4.2. Details of the Product Innovation



Figure 1. The general arrangement and design idea.

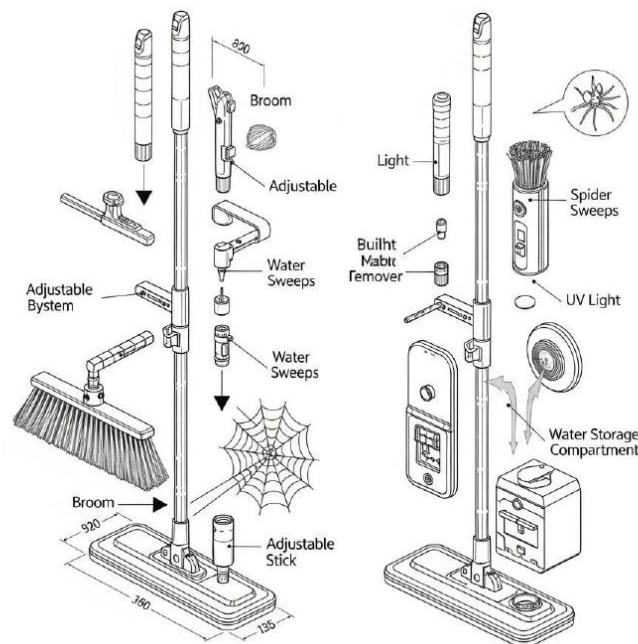


Figure 2. The general arrangement and design idea.



Figure 3. The general arrangement and design idea.

5. DISCUSSION

5.1. Novelty and Uniqueness of Product Innovation

In a highly competitive marketplace of cleaning gadgets and smart appliances, true progress goes beyond the superficial restyling or minor refinement of outdated designs. It involves a fundamental rethinking of functionality, form, and human interaction with technology in everyday life. Cleanova is truly revolutionary in the sense that it does not merely add on a new feature but redefine the entire concept of domestic cleaning as a hassle-free, intelligent process. What distinguishes it is that it can be multifunctional, include sterilization technology, modular design, ergonomics, and have the potential to transform household and industrial cleaning standards.

One of the most remarkable features in Cleanova is its all-in-one capability. With traditional cleaning tools, they each do one thing, like brooms for sweeping, mops for wet mopping, and dusters for dusting into tight spaces. Cleanova puts all those into one tool. Unlike most of the hybrid products out there that compromise on quality in order to be multi-purpose, Cleanova uses a modular system where each cleaning head is specially designed to do the job it is meant for. The result is a product that delivers both performance and flexibility.

Another standout element is Cleanova's built-in UV-C light sanitizer, something that is not typical or ever seen in portable cleaning tools. The majority of products available fail to even approach the topic of microbial sanitation, and those that do often have to utilize other UV sterilizers or aggressive chemical disinfectants. Cleanova's use of UV-C technology, safely located at the base of the device, allows for surface sanitizing in real time during cleaning. The feature responds to the growing global concern over cleanliness in the wake of a post-pandemic world where consumers are more conscious than ever about viruses, bacteria, and cross-contamination at home. UV-C disinfection is also chemical-free, as for Cleanova's green policy, and healthier for families with children, pets, or respiratory sensitivities.

Cleanova features a modular design with manually removable cleaning heads that allow individuals to switch between sweeping, mopping, spraying, dusting, and UV sterilization depending on their requirement. This makes the product lightweight, durable, and easy to maintain relative to traditional multi-functional cleaners based on heavy mechanical frameworks.

The interchangeable heads snap securely into place, offering safety and convenience without the electronic bulk. Cleanova's sleek, ergonomic design is visually appealing compared to bulky functional devices that can be relegated to storage. It is an effective device that owners can openly leave on the counter and use daily.

Cleanova was designed with minimalism and style in mind since it is thin, light, and complex with neon blue accents that have high-end futurism style emanating from them, which is attractive to modern homeowners. The product is just as aesthetically pleasing as functional, appealing to individuals to embrace everyday cleaning instead of dreading it.

Cleanova's green style philosophy is also what sets it apart. The product is made of washable and replaceable components, eradicating wastage inherent in throwaway pads, throwaway cleaners, and plastic containers. Its water-saving spray mode, battery effectiveness, and effectiveness in combining a variety of tools into a single product further minimize environmental impact as well as household space occupation. These traits are in accordance with the targets of Sustainable Development Goal 12: Responsible Consumption and Production, which seeks to use natural resources effectively and minimize waste by creative product design and sustainable conduct (Goal 12: Responsible Consumption and Production - the Global Goals, 2024). Cleanova is also inclusive. The product is not cumbersome, minimizes bending and lifting, and includes safety features like UV shut-off and anti-slip handles. These are especially suitable for not only the young adult or technophile but also the elderly, disabled individuals, or caregivers in assisted-care environments.

Overall, Cleanova is a new benchmark for the cleaning appliance market where user-friendly, thoughtful design is combined with functionality, eco-friendliness, and design in one simple-to-use machine.

5.2. Benefits to Mankind

Nowadays, cleanliness and hygiene are not something we desire, but it has become an absolute necessity. Therefore, the machinery that we use to maintain our surroundings indeed plays a vital role in public health, individual well-being, and environmental sustainability. Cleanova, as an intelligent, multifunctional cleaning machine, facilitates two of the Sustainable Development Goals (SDG) which are SDG 3 (Good Health and Well-being) and SDG 12 (Sustainable Consumption and Production) (United Nations, 2020). It offers significant and diverse benefits to mankind that extend far beyond surface cleanliness. It beneficially contributes to enriching quality of life, reducing health risk, enhancing accessibility, and promoting sustainable living.

The biggest contribution Cleanova gains is the promotion of health and hygiene (SDG 3). By using UV-C light technology, Cleanova literally sterilizes surfaces while it cleans. Unlike traditional methods that only eliminate visible dirt, Cleanova also kills microbial contaminants such as bacteria, viruses, and fungi. This is especially relevant in a post-pandemic world where homes and public spaces are even more health-conscious about hygiene. In households where children, older persons, or immunocompromised people live, such a degree of sanitizing can considerably reduce the possibility of being infected through surface transmission (WHO, 2021).

Cleanova also benefits mankind by simplifying the act of cleaning and making it accessible. Traditional cleaning tools often involve extensive physical effort through bending, scrubbing, lifting heavy buckets, and reaching high corners. Such activities would be exhausting or even unfeasible for elderly users, the disabled, or those recovering from injury. Cleanova's curved shape, lightweight frame, and extendable handle eliminate many of these barriers. It allows for more individuals to be responsible for cleanliness by themselves within their environment.

Another benefit is the reduced chemical exposure. Most houses employ toxic chemical cleaners for disinfecting that can release lethal fumes or have toxic residues, hurting pets or young children if ingested. Cleanova's UV sterilization process renders such chemicals unnecessary by offering an environmentally friendly, non-toxic solution. This not only safeguards the health of people living in homes but also preserves indoor air quality and prevents unnecessary chemical leaching into water systems.

Cleanova is also eco-friendly in the sense that it encourages sustainable consumption. With the five-in-one combination of the capabilities of five single tools, it abolishes the need for multiple purchases, reducing production and waste altogether. Its washable, reusable mop pads and spray system also abolish the wasteful use of single-use plastics from disposable wipes and spray bottles. For green consumers, Cleanova is one step closer to zero-waste and minimalist living.

In the context of busy lifestyles, saving time is another major benefit. Cleanova facilitates the cleaning process by avoiding tool-shifting or unnecessary operations. Through its ability to mop, spray, sanitize, and dust in a single pass means the user can clean more efficiently in a shorter duration. This increased efficiency can mean less stress and more free time for personal, family, or professional work, which is a tangential but important improvement in general satisfaction in life.

Away from the domestic setting, Cleanova can be used in public health institutions such as hospitals, schools, childcare facilities, and old persons' homes where hygiene is paramount. It can further be utilized in business cleaning services for business premises and hotels by simplifying processes and reducing the levels of physical exertion that must be incurred to perform repetitive activities.

Cleanova's benefit to mankind is triple-layered. Cleanova safeguards health, makes healthy living easier, allows environment-friendly living, and complies with today's consumer values of health consciousness.

5.3. Potential of Commercialization

Commercialization is the process of bringing new products or services to market (Kenton, 2020). The potential commercialization occurs in the innovation lifecycle, where invention transforms from a prototype into a product in the marketplace. The potential for commercial success is considerable because of a unique value proposition and alignment with consumer trends and market gaps. Cleanova product is a solution that offers commercial appeal across multiple industries and consumer segments.

The commercialization potential of the Cleanova integrated cleaning tool, which combines into a single product, reflects the growing demand for multifunctional and space-saving household products. In modern households, in urban and compact living environments, consumers prioritize products that enhance efficiency and can minimize storage needs. This product addresses consumer preferences by offering a solution to five common cleaning tasks. For example, the convenience and compact design make it more attractive to students or individuals who live in shared spaces where storage constraints are the main issues.

Furthermore, the trend leaning towards sustainable living and smart home integration, the product versatility aligns with market expectations for convenience and dynamic solutions. The commercialization avenues include online platforms such as Shopee, Lazada, Amazon, and others. The business strategies can do as well as involve collaboration with home retailers, cleaning services, and property developers. The product can also reach international market levels, especially in densely populated cities where space is a top priority.

Moreover, the Cleanova holds strong viability from a production and scalability perspective. The five components are commonly used, widely manufactured, and relatively low-cost in material. The use of interchangeable handles and modular systems does not require a highly advanced technology, allowing for feasible mass production through existing plastic molding and assembly infrastructure. This manufacturing enables a faster time to market with the support of original equipment manufacturers (OEMs) and contract manufacturers in Asia countries. The initial development costs are also low, while the design pattern can protect the product's uniqueness, which allows for such exclusive branding of Cleanova, could maximize the profit.

Strategically, commercialization significantly aligned with environmental and sustainability trends. The consumers in the market nowadays increasingly make purchasing decisions based on the environmental and social impact. The eco-friendly product invention can fit into the conscious consumer base. The marketing should highlight the reduction in material usage due to the integration of multiple tools into a single product. This will minimize the need to manufacture, purchase, and store five separate tools that effectively reduce material waste. The collaboration with sustainability-focused influencers in social media for home care, minimalist living, and eco-lifestyle could enhance the product visibility. These influencers can create awareness and demonstrate the product's convenience and benefits, which could gain the trust of consumers.

Thus, Cleanova's multifunctionality, smart clean, and space-saving design give the commercialization potential. The potential of Cleanova marketing, environmental sustainability, and production scalability could establish it as a leading brand of home hygiene and cleaning technology in the future.

6. CONCLUSION

In a nutshell, the concept of Cleanova represents the development of the 5-in-1 home appliance that is a notable advancement in household technology by consolidating multiple cleaning functions such as sweeping, mopping, feather dusting, UV sterilization, and cobweb dusting into one integrated product. This invention exemplifies incremental improvement in product design that can address the increasing demand for convenience, efficiency, and sustainable living. From a strategic operations management perspective, combining several cleaning tools into a single product can optimize the user experience by reducing waste consumption and focusing on good health and well-being for individuals. It also aligns with global sustainability objectives, particularly those outlined in Sustainable Development Goal 3 (Good Health and Well-Being) and Sustainable Development Goal 12 (Responsible Consumption and Production).

The invention status currently lies in the phase of prototype development and initial market testing that reflects a transition from concept to practical application. Refining design features, ensuring product reliability, and validating the user experience enhances the potential for this product especially among urban households where space constraint and time scarcity necessitates an efficient cleaning solution. The invention of Cleanova can increase user satisfaction because it reflects effective utilization of existing technologies in a new and creative way of products.

Commercially, continuous invention includes potential integration with smart home technologies that can enhance product differentiation and meet the expectations of Industry 5.0, which emphasizes sustainable technological advancement. The importance of technology advancement, user-centric design, robust quality assurance, and strong after-sales support can build consumer trust and brand loyalty for Cleanova products.

However, Cleanova offers a comprehensive solution to modern cleaning needs while embedding sustainability principles in the core design. It stands as an exemplary model of how product invention can improve daily life convenience, be responsible for user consumption, and contribute positively to environmental conditions. With strategic development and a good market positioning, this invention has the potential to overcome traditional home cleaning markets and inspire further advancements in sustainable household technologies.

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