GL BAJAJ COLLEGE OF TECHNOLOGY AND MANAGEMENT,

GREATER NOIDA

MINI PROJECT- I

ON

"PUREAURA: PORTABLE AIR PURIFIER"

TOWARDS THE PARTIAL FULFILMENT FOR THE AWARD OF THE DEGREE

OF

MASTER OF BUSINESS ADMINISTRATION (MBA)

(Dr. A.P.J. Abdul Kalam Technical University, Lucknow, Uttar Pradesh)

by

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ROLL NO.- B-24061

Session 2024-25

Under the Supervision of

DR. GOPAL PATHAK

DECLARATION

I hereby declare that the work presented in this report entitled “MINI PROJECT-I", was carried out by me. I have not submitted the matter embodied in this report for the award of any other degree or diploma from any other University or Institute. I have given due credit to the original authors/sources for all the words, ideas, diagrams, graphics, computer programs, experiments, and results, that are not my original contribution. I have used quotation marks to identify verbatim sentences and given credit to the original authors/sources.

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Name : AYUSH KUMAR

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(Candidate Signature)

CERTIFICATE

This is to certify that AYUSH KUMAR., Roll No B-24061 has undertaken this project titled "PUREAURA: PORTABLE AIR PURIFIER" for the partial fulfilment of the award of **Master of Business Administration** degree from DR A P J Abdul Kalam Technical University, Lucknow (U. P.)**.**I wish him/ her all the best for his/her bright future ahead.

Date:

Project Supervisor

Department of Management Studies

Head of Department

Department of Management Studies

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Introduction: Portable Air Purifier

In today's world, increasing urbanization and industrialization have led to a significant rise in air pollution levels, posing severe health risks. Airborne pollutants such as particulate matter (pm2.5 and pm10), allergens, and harmful gases not only affect respiratory health but also exacerbate existing medical conditions. As individuals spend a considerable portion of their time in polluted environments, the demand for personal air purification solutions has surged.

A wearable air purifier is an innovative solution designed to address this challenge by offering portable and efficient air filtration. Unlike traditional air purifiers that are stationary, wearable air purifiers are compact, lightweight, and designed for personal use. They provide a clean and breathable air zone around the user, enhancing their comfort and well-being in polluted environments.

This mini project explores the concept, design, and feasibility of wearable air purifiers as a scalable business idea. It evaluates the market potential, key customer segments, and competitive landscape. Additionally, it delves into the technical and operational aspects of creating a wearable air purifier prototype, highlighting its functionality and unique value proposition.

Primary Aim:

The primary aim of this project is to bridge the gap between innovation and practicality, offering an eco-friendly, user-centric product that aligns with sustainable development goals and caters to the increasing consumer demand for health-centric technology. Through this project, we aim to demonstrate how wearable air purifiers can revolutionize personal air quality management and contribute to a healthier, pollution-free lifestyle.

Problem definition:

Air pollution is a growing global concern, with urban areas experiencing alarming levels of particulate matter (pm2.5 and pm10), harmful gases, and allergens. Prolonged exposure to polluted air poses severe health risks, including respiratory diseases, cardiovascular conditions, and decreased overall well-being. According to studies, poor air quality is a leading cause of premature deaths and chronic illnesses worldwide.

While stationary air purifiers provide an effective solution for indoor environments, they fail to address the need for personal air quality control when individuals are on the move. This gap is especially significant for commuters, outdoor workers, and individuals in densely populated areas where pollution exposure is unavoidable. Current portable air purification devices are often bulky, inefficient, or lack the convenience needed for everyday use.

The problem, therefore, is the lack of a compact, efficient, and wearable air purification solution that provides individuals with clean, breathable air irrespective of their location. This project aims to address this issue by designing a wearable air purifier that combines portability, user comfort, and advanced filtration technology to ensure personal air quality

management. The solution seeks to empower users to combat air pollution proactively while maintaining their mobility and comfort.

Objectives:

1. Design and development:

   To design a compact, lightweight, and ergonomically wearable air purifier and to incorporate advanced air filtration technology (hepa filters, activated carbon, etc.) for effective pollutant removal.

2. Functionality:

   To ensure the device filters out particulate matter (pm2.5 and pm10), allergens, and harmful gases ,to develop an energy-efficient system powered by a rechargeable battery and to enable adjustable fan speed for user convenience and optimal airflow.

3. Portability and usability:

   To create a device that is easy to wear and suitable for prolonged use and also to ensure the design is durable and user-friendly, with features like a usb charging port.

4. Market viability:

   To analyze the market demand for wearable air purifiers and identify potential customer segments and to evaluate the product's cost-effectiveness and scalability for mass production.

5. Sustainability and innovation:

   To explore eco-friendly materials and components for a sustainable product design and to incorporate additional features such as air quality monitoring or uv sterilization for enhanced functionality.

6. Health and environmental impact:

   To reduce exposure to airborne pollutants and improve the health and well-being of users and to contribute to raising awareness about personal air quality management solutions.

7. Project outcomes:

   To develop a working prototype of the wearable air purifier and to document findings, challenges, and recommendations for future improvements.

Summary of target market and demographics:

The target market for a wearable air purifier primarily consists of health-conscious individuals and those exposed to high levels of air pollution. The product caters to a diverse group of consumers who prioritize personal well-being and seek convenient solutions to combat environmental hazards. Below is a detailed breakdown of the target market and demographics:

1. Geographic segmentation:

- Urban areas with high levels of air pollution (e.g., cities with industrial activity or heavy vehicular traffic).
- Regions experiencing seasonal pollution events like smog, wildfires, or sandstorms.
- Countries where air quality is a public health concern, such as India, China, and major metropolitan cities globally.

2. Demographic segmentation:

Age:

- Adults aged 25-45 who are active professionals, daily commuters, or outdoor workers.
- Elderly individuals aged 60+ who are more vulnerable to respiratory issues.
- Parents seeking health products for their children.

Income:

- Middle to upper-income groups who can invest in personal health gadgets.

Gender:

- Both males and females, with potential customization for style preferences (e.g., color, size).

3. Psychographic segmentation:

Lifestyle:

- Health-conscious individuals who prioritize wellness and preventative healthcare.
- Tech-savvy consumers interested in innovative wearable gadgets.

Behavior:

- Individuals with a history of respiratory issues or allergies.
- Environmentally aware customers seeking eco-friendly solutions.

4. Industry-specific segments:

Outdoor workers:

- Construction workers, delivery personnel, and traffic police.

Commuters:

- Urban residents who rely on public transportation or walk in polluted areas daily.

Fitness enthusiasts:

- Joggers, cyclists, and athletes who exercise outdoors.

Healthcare sector:

- Individuals working in medical or caregiving environments with high exposure to pathogens.

Market potential:

The wearable air purifier addresses a universal problem, making the market highly scalable. Early adoption is expected from urban professionals, frequent travellers, and tech enthusiasts, with broader acceptance as awareness about air pollution and health impacts increases so by targeting this market, the wearable air purifier can position itself as a practical and essential lifestyle product, blending health benefits with convenience and portability.

Industry competition and market capture strategy:

Industry competition:

The market for portable air purifiers is increasingly competitive, with several established players and startups offering a range of personal air purification devices. Global brands like Dyson, Philips, and Xiaomi that offer advanced air purification technology with strong brand recognition.

Specialized startups innovators focusing on wearable air purification, such as Airtamer and LG Puricare with low-cost alternatives generic, low-cost options available through e-commerce platforms. Despite the competition, gaps remain in affordability, portability, and design customization, providing opportunities for differentiation.

Challenges in the competitive landscape:

High cost of premium products restricts accessibility for middle-income groups,bulky designs limit the usability of many existing wearable air purifiers and lack of features like real-time air quality monitoring in lower-end products.

Market capture strategy:

Product differentiation through design which will offer a compact, lightweight, and aesthetically pleasing wearable purifier.It will use ergonomic designs that prioritize comfort for prolonged use with affordable pricing positioning the product as a cost-effective alternative to high-end brands,leveraging economies of scale to reduce production costs.

Innovative features:

This purifier will incorporate value-added features like real-time air quality sensors, uv sterilization, and adjustable airflow,using eco-friendly materials to appeal to environmentally conscious consumers through targeted marketing focus on high-pollution regions and urban centers with strong consumer demand.

Leveraging digital marketing to reach tech-savvy and health-conscious audiences through strategic partnerships ,collaborating with healthcare providers, fitness centers, and corporate wellness programs to promote the product and partnering with e-commerce platforms and retail outlets for wider distribution.

Customer engagement:

Build brand trust through transparent communication about product effectiveness and certifications,offer excellent after-sales support and warranty services to enhance customer satisfaction.By addressing unmet consumer needs and strategically positioning the product, the company can effectively capture a share of the wearable air purifier market and establish itself as a competitive player.

Materials required:

1. Electronics:
    - Small centrifugal fan or mini blower.
    - Hepa filter or activated carbon filter.
    - Rechargeable li-ion battery (e.g., 3.7V 18650 battery).
    - Boost converter (if needed to regulate voltage).
    - On/off switch.
    - USB charging module (e.g., tp4056).
    - Led indicators for power and charging status.

2. Sensors (optional for enhanced functionality):
    - Pm2.5 sensor (e.g., sds011).
    - Gas sensors (e.g., mq-135 for harmful gases).

- Temperature and humidity sensor.

3. Housing:
    - Lightweight, non-toxic plastic casing.
    - Elastic bands or straps for wearing around the neck, wrist, or as a badge.
    - 3D printer (optional, for custom design).
4. Tools:
    - Soldering kit.
    - Multimeter.
    - Glue gun or epoxy.
    - Small screws and screwdrivers.

Design plan:

Airflow mechanism:

The centrifugal fan draws air through a hepa or carbon filter and thus,clean air exits through an outlet positioned near the user's breathing zone.

Power supply:

The rechargeable battery powers the fan and other electronics with a USB charging port allows recharging.

Portability:

Design the purifier to be lightweight and wearable around the neck or clipped to clothing.

Optional features:

Real-time air quality monitoring and display using an oled screen or led Bluetooth module for data tracking on a smartphone app.

Current challenges in air purifier market and solutions with wearable air purifier:

1. Bulky and stationary designs

Challenge: most air purifiers are designed for stationary use and are unsuitable for individuals who require clean air while commuting or outdoors.

Solution: the wearable air purifier offers a compact, portable design that ensures continuous access to purified air regardless of location. Its lightweight and ergonomic build make it easy to wear throughout the day.

2. Limited personal air protection:

Challenge: traditional air purifiers are designed for large indoor spaces, providing indirect benefits but not specifically targeting personal air quality.

Solution: the wearable air purifier creates a localized air-cleaning zone around the user, ensuring they breathe purified air directly.

3. High cost of premium products:

Challenge: advanced air purifiers with effective filtration technologies are often expensive, making them inaccessible to middle-income consumers.

Solution: by focusing on cost-efficient manufacturing and streamlined features, the wearable air purifier can offer affordability without compromising essential performance.

4. Lack of mobility and convenience:

Challenge: conventional devices are not practical for on-the-go use due to their size and power requirements.

Solution: the wearable air purifier is battery-operated with usb charging, offering convenience for users in transit. Adjustable fan speeds add customization, enhancing user comfort.

5. Incomplete filtration capabilities:

Challenge: some air purifiers lack comprehensive filtration, failing to address specific pollutants like odors, allergens, or harmful gases.

Solution: the wearable air purifier integrates a combination of hepa and activated carbon filters to effectively capture fine particles and odors, ensuring cleaner air.

6. Environmental concerns:

Challenge: many air purifiers rely on non-recyclable materials and high energy consumption, contributing to environmental degradation.

Solution: the product uses eco-friendly materials and energy-efficient technologies, aligning with sustainable practices and reducing environmental impact.

7. User awareness and adoption:

Challenge: many consumers are unaware of the benefits of air purifiers or do not prioritize personal air quality.

Solution: the wearable air purifier can leverage awareness campaigns and partnerships with health organizations to educate users about air pollution and promote proactive measures for health.

By addressing these challenges, the wearable air purifier fills a critical gap in the market, delivering a practical, user-centric, and sustainable solution for managing personal air quality.

Industry overview and idea generation:

Existing market competition and major players in the air purifier industry:

The air purifier market is highly competitive, encompassing a mix of global corporations, specialized brands, and emerging startups. The competition spans across various segments, including home air purifiers, portable units, and wearable devices. Below is an overview of the market competition and key players.

1. Established global players:

Dyson:

Known for premium-quality air purifiers with advanced filtration systems and additional features like heating and cooling,focuses on innovative technology and sleek design and high-end pricing targets affluent customers.

Philips:

Offers a wide range of air purifiers, from basic models to smart, app-controlled devices,emphasizes air quality monitoring and energy efficiency also strong presence in both developed and emerging markets.

Honeywell:

Specializes in durable and reliable home air purifiers with hepa filters and odor control,caters to a broad audience with competitively priced options.It is also known for robust performance and minimalistic designs.

LG Electronics:

Features premium air purifiers like LG Puricare, including wearable options with dual fans and hepa filters,focuses on innovation, such as smart connectivity and advanced filtration and targets tech-savvy and high-income consumers.

2. Emerging startups and niche brands:

Airtamer:

One of the leading brands in the wearable air purifier space that specializes in ionic air purifiers that use negative ions to clean the air and provide compact and battery-operated, but limited effectiveness compared to hepa-based solutions.

Blueair:

Focuses on health-centric and eco-friendly air purifiers also offers smart, app-integrated products with multi-stage filtration which primarily targets environmentally conscious consumers.

Known for premium and medical-grade air purification solutions which offers specialized models like personal air purifiers for travel and wearable applications and highly effective but expensive, catering to a niche market.

3. Low-cost generic brands:

Numerous generic brands, especially in online marketplaces like amazon and alibaba, provide affordable air purifiers that often lack advanced features and durability but appeal to budget-conscious customers and quality and performance may vary widely.

Market landscape:

Strengths of competitors:

- High brand recognition and consumer trust (e.g., Dyson, Philips).
- Established distribution networks and after-sales services.
- Broad product portfolios catering to various customer needs.

Weaknesses of competitors:

- Premium pricing excludes middle- and lower-income groups.
- Larger models are impractical for personal or on-the-go use.
- Limited availability of truly wearable, lightweight air purifiers.

Opportunities for new entrants:

The existing competition reveals gaps that can be leveraged:

1. Affordability: offering cost-effective wearable air purifiers to capture middle-income segments.
2. Portability: addressing the demand for lightweight, convenient designs suitable for outdoor and mobile use.
3. Innovation: adding unique features like real-time air quality monitoring, uv-c sterilization, or eco-friendly materials.
4. Targeted marketing: focusing on regions with severe pollution and raising awareness about personal air quality solutions.

By addressing these gaps, a new wearable air purifier brand can position itself as a practical and innovative solution, carving out a significant share in this competitive market.

What inspired the business idea: Wearable Air Purifier:

This business idea came from a combination of problems people face and new opportunities in the world today. Here's why we thought of creating a wearable air purifier:

1. Air pollution is a big problem:

   Air pollution has become worse in many cities because of cars, factories, and construction so breathing polluted air can cause health problems like asthma, allergies, and heart issues as many people now want ways to protect themselves from dirty air, especially when outside.

2. Current air purifiers aren't enough:

   Big air purifiers work well indoors but cannot help people when they are outside or moving around and also there aren't many options for portable or wearable devices that can clean the air around a person.

3. People care more about health:

   More people are taking steps to stay healthy and avoid getting sick from pollution thus personal health products, like fitness trackers, masks, and now wearable air purifiers, are becoming popular.

4. Better technology:

   Technology has improved, making it possible to create small and powerful air purifiers,features like rechargeable batteries and filters that fit in small devices make this idea practical.

5. Covid-19 changed how we think about air:

   After the pandemic, people became more careful about the air they breathe, especially in crowded places and devices that can help protect people in public spaces, like wearable air purifiers, are in demand.

6. Outdoor workers and active people need solutions:

   Many people, like delivery workers, commuters, and joggers, spend time outside in polluted air.They need something portable and easy to use that keeps the air around them clean.

7. Eco-friendly trends:

   People are looking for products that are good for the environment and energy-efficient.A wearable air purifier can use eco-friendly materials and low power to meet this demand.

In simple terms, this idea was inspired by the need to help people stay safe from pollution wherever they go. It's about creating a small, easy-to-use device that solves a big health problem in a smart and sustainable way.

Market analysis and competition:

Target market, their needs, and geographical location:

1. Target market:

The target market for the wearable air purifier can be divided into several key segments, each with specific needs:

A. Urban commuters and workers:

- Needs:
    - Protection from air pollution during daily travel and commutes.
    - A portable, easy-to-wear device that can be used on the go.
    - Lightweight and comfortable for long hours of use.
- Geographical location:
    - Cities with high pollution levels: these include major urban like New Delhi, Beijing, Mexico city, Los Angeles and Mumbai, where air quality is often hazardous.
    - Other high-density urban areas: cities where traffic congestion and industrial emissions cause severe air pollution.

B. Outdoor workers:

- Needs:
    - Protection from polluted outdoor air, especially in construction sites, factories, and delivery services.
    - A wearable solution to improve work conditions without the need for bulky equipment.
    - Easy to wear while working and provides comfort during long hours.
- Geographical location:
    - Construction zones and industrial areas in major cities globally.
    - Emerging markets with growing industrial activity like India, China, and Southeast Asia.

C. Fitness enthusiasts and athletes:

- Needs:
    - Clean air for outdoor activities like jogging, cycling, or hiking.
    - A device that doesn’t hinder physical activity and is lightweight.

- Protection from airborne allergens and pollutants while exercising outdoors.

- Geographical location:
  - Urban areas with large parks and outdoor spaces like San Francisco, London, and Singapore.
  - Polluted regions where people still prefer outdoor sports and physical activities.

Sales and market feasibility:

Product description: Wearable Air Purifier

The wearable air purifier is a personal, compact, and portable device designed to protect individuals from harmful air pollutants while on the go. It uses advanced air filtration technology to clean the air around the wearer, ensuring that they breathe in clean, purified air regardless of their surroundings. The device can be worn around the neck or clipped to clothing, offering an easy and efficient way to improve air quality while commuting, working outdoors, exercising, or traveling.

Key features:

1. Advanced filtration system: equipped with hepa filters or ionization technology to remove pollutants like pm2.5, dust, allergens, smoke, and even bacteria or viruses from the air.
2. Compact and lightweight: designed to be worn comfortably around the neck, this device is lightweight, making it easy to wear for long periods without discomfort.
3. Rechargeable battery: powered by a long-lasting, rechargeable battery that ensures continuous air purification for several hours.
4. Quiet operation: the device is engineered to operate silently, ensuring that the user isn’t disturbed by noise while wearing it.
5. User-friendly design: simple controls with adjustable fan speeds or air purification levels to suit different environments and needs.
6. Eco-friendly: made with recyclable materials and energy-efficient technology to minimize environmental impact.
7. Portable: easy to carry and perfect for commuters, outdoor workers, fitness enthusiasts, or travelers who spend time in polluted areas.
8. Stylish and comfortable: sleek design options that match various personal styles and ensure comfort while wearing.

Unique Selling Proposition (USP):

The wearable air purifier's USP lies in its combination of portability, personalized air purification, and convenience, making it a solution for people who need protection from air pollution wherever they go.

Key differentiators:

1. On-the-go air quality protection: unlike traditional air purifiers that are stationary, this device allows users to carry their air purifier with them wherever they go, ensuring they breathe clean air whether commuting, working, or exercising outdoors.

2. Compact and comfortable design: the wearable nature of the device makes it easy to use without being bulky or intrusive. It's lightweight, stylish, and ergonomic, making it comfortable to wear for long periods.
3. Targeted personal air purification: focuses on the immediate air around the user, rather than purifying the entire room or space. This targeted approach allows for more efficient purification and direct protection for the individual.
4. Ideal for high pollution areas: perfect for people living or working in areas with high levels of air pollution. Whether in crowded cities or industrial zones, this wearable air purifier provides real-time protection against hazardous airborne particles.
5. Health and wellness focused: with growing health concerns around air quality, this device gives people a proactive way to reduce their exposure to pollution, allergens, and harmful particles, contributing to long-term well-being.
6. Innovative and eco-friendly: with advanced technology and an eco-conscious design, the product appeals to customers who are looking for both technological innovation and environmentally friendly products.
7. Affordable personal air purification: provides a more accessible, portable alternative to expensive stationary air purifiers, making it an affordable option for those who need air quality protection in a flexible, mobile format.

By focusing on portability, convenience, and user-centric design, the wearable air purifier stands out in the market as a practical solution to air pollution and health concerns for individuals on the go.

Pricing strategy:

The business will use a cost-based and value-based pricing strategy to ensure profitability while remaining competitive.

1. Cost-based pricing:
    - Manufacturing costs: ₹6,000 - ₹8,000 per unit (materials, assembly, etc.).
    - Marketing & distribution: ₹1,000 - ₹2,000 per unit.
    - Target profit margin: 35% - 50%.
2. Competitive pricing:
    - The market price for similar products ranges from ₹8,000 to ₹20,000.
    - Our price will be set between ₹10,000 and ₹15,000 based on features.
3. Value-based pricing:
    - The device offers health protection and portability, which justifies its price.
    - Customers benefit from clean air on the go, making it a valuable solution for those in polluted environments.

4. Tiered pricing:
    - Basic model: ₹8,000 - ₹10,000 (simple filtration, budget-friendly).
    - Premium model: ₹12,000 - ₹15,000 (enhanced features and design).

This pricing strategy ensures a balance of affordability, market competitiveness, and profitability.

Product distribution strategies:

To effectively reach the target market, the company will employ a multi-channel distribution strategy, ensuring broad availability and customer access to the wearable air purifier.

1. E-commerce channels:

Company website will be used to sell the product directly through the company's website, allowing customers to purchase directly, learn more about the product, and access exclusive offers.Online marketplaces will help to promote the wearable air purifier on popular e-commerce platforms like amazon India, Flipkart, and Snapdeal, reaching a wider audience across the country and Global platforms will be used for international sales, the product can be distributed through amazon global or other region-specific platforms like Aliexpress and Ebay.

2. Retail partnerships:

Electronics and health stores that partner with major retailers like Croma, Reliance Digital, and Big Bazaar to sell the product in physical stores, allowing customers to experience it firsthand and Health and wellness stores that collaborate with stores focused on health products and fitness gear, such as decathlon or specialized wellness shops.

3. Direct B2B Sales:

Corporate partnerships will offer bulk sales to companies that want to provide wearable air purifiers to employees working in polluted areas or as part of corporate wellness programs and Government contracts will approach local or national governments to sell the product for use by employees in hazardous environmental conditions or public service sectors like law enforcement and emergency responders.

4. Fitness and outdoor retailers:

Sports retailers will help market the wearable air purifier to fitness enthusiasts through partnerships with decathlon, Nike stores, and other fitness gear suppliers along with Outdoor and travel gear stores to target consumers who engage in outdoor activities by partnering with stores like wildcraft, the north face, and other outdoor lifestyle brands.

5. Influencer and affiliate marketing:

Influencer partnerships through collaboration with health, fitness, and lifestyle influencers to promote the product on social media platforms like Instagram, Youtube, and Tiktok, encouraging direct online sales and affiliate marketing to set up an affiliate program to allow bloggers, health and wellness websites, and tech review sites to promote and sell the product for a commission.

6. Direct sales through fitness and health apps:

Partnerships with health apps: integrate product sales into popular health and fitness apps, like google fit or apple health, where users can purchase the product as part of their fitness journey.

7. Pop-up stores and events:

Trade shows & exhibitions: attend relevant industry events, expos, and trade shows related to health, tech, and consumer electronics, to showcase the product to potential buyers and distributors along with Pop-up events set up temporary stores in high-traffic locations or malls, allowing customers to try the product before purchase.

This distribution strategy ensures broad market coverage, targeting both online and offline channels, and leverages strategic partnerships to maximize the product's visibility and accessibility to diverse customer segments.

Major bottlenecks and solutions:

1. Supply chain and manufacturing delays:

   Solution: diversify suppliers, maintain buffer stock, and streamline production to avoid delays.

2. High production costs:

   Solution: negotiate bulk deals, use cost-effective components, and improve production efficiency.

3. Market awareness and adoption:

   Solution: focus on educational marketing, influencer partnerships, and offer trial periods to build trust.

4. Pricing sensitivity:

   Solution: implement tiered pricing, offer discounts/promotions, and highlight long-term health benefits.

5. Competition:

   Solution: differentiate with unique features, offer excellent customer service, and innovate regularly.

6. Technology and product development issues:

   Solution: partner with R&D experts, focus on continuous testing, and optimize product design.

7. Regulatory approvals:

   Solution: ensure compliance with relevant regulations and seek necessary certifications before launch.

Financial and technical feasibility:

Revenue model outline for wearable air purifier:

1. Direct sales (b2c):

   E-commerce: selling through the company website and online platforms (amazon, flipkart).

   Retail sales: distribution through physical stores like electronics, health, and fitness retailers.

2. Wholesale/bulk sales (b2b):

   Corporate sales: offering bulk purchases to businesses for employee health programs.

   Government contracts: supplying to government organizations and institutions.

3. Subscription model:

   Filter replacement: recurring revenue from customers who subscribe to regular filter replacements.

4. Affiliate marketing:

   Partnerships with influencers: earning commissions from influencers and affiliates promoting the product.

This model generates revenue through one-time purchases, bulk orders, recurring services (filter replacements), and strategic partnerships.

Financial planning and estimated sales volume for wearable air purifier:

Here's an overview of the financial planning and estimated sales volume for the wearable air purifier business-

Initial costs and investment:

The initial costs include research and development (R&D), product design, materials, manufacturing, and marketing. Key financial components:

- Research & development (R&D): ₹40,00,000 - ₹80,00,000
  - Includes prototyping, testing, and finalizing the design.
  - Costs for product engineering, air filtration technology, and battery optimization.
- Manufacturing setup: ₹80,00,000 - ₹1,60,00,000

- Initial production costs for components such as hepa filters, fans, batteries, and wearable housing.
- Factory setup or contract manufacturing agreements.

- Marketing and branding: ₹24,00,000 - ₹40,00,000
  - Digital marketing campaigns (social media, influencers, online ads).
  - Trade shows, partnerships with health and fitness organizations, and pr campaigns.
- Operating expenses: ₹16,00,000 - ₹32,00,000 (initial year)
  - Costs of warehousing, distribution, salaries, and office overheads.

Sales channels:

The revenue will come from a variety of sales channels:

- Online sales: through e-commerce platforms like Amazon India, the company website, and other online retailers.
- Retail partnerships: collaboration with health, fitness, and electronics stores.
- Corporate and bulk orders: targeting corporate wellness programs, outdoor businesses, and government departments.

Technical feasibility of the wearable air purifier using available technology:

1. Air filtration technology:

   Hepa filters provides high-efficiency particulate air (hepa) filters are already widely used in air purifiers and can be effectively miniaturized for wearable devices. These filters can capture pm2.5, dust, allergens, and other harmful particles. Ionization technology that ionizers, which generate negatively charged ions to attract and neutralize airborne particles, are another available technology that can be integrated into a compact wearable device.

   Carbon filters used to absorb odors and volatile organic compounds (vocs), carbon filters can be incorporated for improved air quality.

2. Battery technology:

   Lithium-ion batteries that are small, rechargeable lithium-ion batteries are widely available and offer long-lasting power while being lightweight, making them ideal for a wearable air purifier which also provides energy efficiency having battery life of around 6-10 hours on a single charge can be achieved using efficient, low-power fans and filtration systems.

3. Miniaturization of component:

   Advances in miniaturization allow for the integration of air filtration, fans, and batteries into a compact and lightweight wearable format. Modern technology

ensures that the device can be both small and effective without compromising performance.

4. Noise control technology:

   Quiet fans designs, such as brushless dc motors, can be used to minimize noise while maintaining adequate airflow for air purification with noise reduction techniques can also be applied to ensure that the device remains comfortable for long wear.

5. Design and comfort:

   Ergonomic design that is wearable air purifiers can be designed to be worn comfortably around the neck or clipped to clothing. Materials like lightweight plastics and soft silicone are commonly used for comfort and durability with waterproof and dust-proof materials with ip ratings (e.g., ipx4 for water resistance) ensures durability in various environmental conditions.

6. Smart features:

   App integration that use of bluetooth technology can allow users to monitor air quality, battery life, and filter status through a mobile app and air quality sensors can be integrated to detect pollution levels and adjust the filtration power accordingly.

Conclusion:

The wearable air purifier is technically feasible with available technologies, including efficient air filtration systems, miniaturized components, long-lasting batteries, and low-noise fans. The integration of smart features and ergonomic design will ensure the product meets customer expectations for portability, comfort, and performance.