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UNIVERSITI
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TECHNOLOGY BLUEPRINT SMART & PROTECTIVE SHOE RACK

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1.0 EXECUTIVE SUMMARY

The Smart & Protective Shoe Rack is an innovative furniture solution designed to address the modern need for organized, hygienic and smart shoe storage. Integrating smart technology, this product features a mini exhaust fan, a nebulizing fragrance diffuser and an automatic sensor system that monitors air quality and activates the fan and diffuser when needed. The use of high-quality, moisture-resistant materials and a cushioned seating area adds practicality and comfort for users.

Targeting young adults aged 21 to 30 years, with a focus on students and young working adults living in urban cities like Kuala Lumpur and Selangor, the product is intended to serve individuals who value cleanliness, convenience and smart living solutions. The target market, according to market research, is about 22,000 potential customers with sales anticipation of 5,000 units for the first year, increasing annually as brand awareness grows.

The competitive edge of the product lies in its innovative combination of smart features and multifunctional design, which differentiates it from traditional shoe racks offered by existing brands. Through an effective marketing strategy of online advertising, internet-based sales platforms and focused physical locations, the business will aim to build its market presence while maintaining its competitive pricing at RM579.15 per unit.

The business is supported by an excellent management team with clearly defined roles in operations and management, finance, sales and marketing and human resources. The financial plan includes start-up costs, working capital and projected revenue streams to ensure sustainability and expansion. With further product development, including the potential integration of IoT and expanded smart home features, the Smart & Protective Shoe Rack has the potential to evolve into a broader range of smart furniture products in the future.

Hence, this outlines the product development, market analysis, technology used, financial planning, and milestones that will guide the project from prototype to commercial launch, positioning it strongly within the smart living and modern furniture market segment.

2.0 PRODUCT OR SERVICE DESCRIPTION

The Smart & Protective Shoe Rack is a modern furniture item with shoe storage and protection from environmental deterioration. The product is unlike a typical shoe rack in that it has technology to protect shoes like a mini exhaust fan to ventilate, nebulizing fragrance diffuser for odor elimination, resistance from moisture due to high-quality wood, and a cushioned section to sit on top. The intelligent sensor technology uses Arduino and MQ-135 gas sensors in odor detection and turns on the fan and diffuser automatically when odor is detected by the rack. The design is minimal, trendy, and functional and hence in line with modern homes.

The primary use of the product is to store and protect shoes, especially high-end shoes, such as leather, designer sneakers, and limited editions. It serves users who value cleanliness, organization, and shoe care. The product also functions as a small bench with seating, making it easier for users to put on or remove their shoes. As a second use, the product can potentially help improve indoor air quality in the home by reducing odors and moisture from entryways, bedrooms and compact living spaces. It may also appeal to smart home users because of its automation and sensor integration.

This shoe rack is unlike any product currently on the market with its integration of smart technology, which is not typically found in traditional shoe racks. By adding a ventilation exhaust fan with a nebulizing fragrance diffuser, it helps control humidity, prevent mold, and eliminate bad odours, since all issues are often mentioned by users of traditional racks. Its automatic sensor system that activates based on air quality adds significant user convenience and hygiene benefits. The aesthetically beautiful, Japanese-inspired design with a waterproof finish, and its value proposition at such a reasonable price point only increases, making it provides multifunctional and premium furniture design. This features, experience and hygiene lifestyle centric shoe rack offers an environmental and odour delivery protection beyond basic shoe storage.

The Smart & Protective Shoe Rack is now moving into the prototype stage. A basic version has been designed and validated through surveys and testing. The team has now developed a functional prototype with working sensors and an exhaust system. It is estimated it will require another 3-6 months and a budget of approximately RM5,000 – RM10,000 will be needed to fully develop the product to the commercial launch. This will include electronics, durability testing, sustainable materials sourcing, and packaging development. The key functional specifications

include air ventilation (mini fan), bad odor detection (MQ-135 sensor), fragrance diffusion (nebulizing diffuser), waterproof wooden frame and cushioned seat. A design sketch and prototype image are available in the project report.

There are no patents have been filed for the product. However, the combination and integration of air quality sensors, fan automation, and fragrance diffusion in a single household furniture item represent a unique design. The software logic and approach of the Arduino automation system could be developed further as a proprietary control system. Trademarking the brand name and product name will also be considered before launching the product.

There are many opportunities for extending the product range. Future models could have app-based control through Wi-Fi (IoT), modular stacking options for more significant household functions, UV light disinfection for shoes, or shoe drying options. It would also be easy to repurpose the same smart storage idea into other furniture models such as smart wardrobes, closets, or bags. Collaborations with home furniture brands or smart home system developers could further additional opportunities for design growth and market penetration into the wider smart living category.