

Unlocking Digital Threads: Key Drivers of 3D Fashion Design Technology Adoption in Fashion Industry in Colombo, Sri Lanka

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Abstract

The adoption of 3D fashion design technology has transformed global fashion industries by enhancing creativity, efficiency, and sustainability. However, in Colombo, Sri Lanka, a city with growing creative talent and a developing fashion sector, this technology remains underutilised. This study addresses the research problem of limited adoption by examining the key factors influencing the integration of 3D design tools among fashion designers in the Colombo district. Employing a quantitative research approach, the study gathered data through structured questionnaires, distributed to 249 respondents using convenience sampling. The conceptual model investigated the impact of four independent variables: performance expectancy, core technology, social influence, and workflow integration, on the adoption of 3D fashion design technology. Regression analysis revealed statistically significant relationships between all four variables and adoption levels, demonstrating predictive strength. Results show that even though designers appreciate the advantages of 3D tools, including rapid prototyping, better fit simulation, and reduced material waste, several barriers persist. These include high implementation cost, a shortage of technical skills, and challenges integrating 3D systems with existing workflows. Social influence, particularly from digital communities and trendsetters, along with access to user-friendly software, emerged as strong adoption enablers. The study contributes to existing knowledge by validating the applicability of widely accepted technology acceptance constructs within the context of Sri Lanka's fashion industry. It offers practical recommendations for policymakers, educators, and industry stakeholders, such as implementing targeted training, encouraging institutional support, and fostering awareness campaigns to strengthen the digital capability of Colombo's fashion ecosystem.

Keywords: 3D fashion design, adoption factors, Colombo, digital transformation, technology integration