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Temporal Dynamics of Academic Research and Public Attention toward Generative AI in Fashion Design: A Bibliometric and Baidu Index Study

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Abstract

Generative AI has moved quickly into fashion design since 2022, yet how this diffusion plays out across academic and public spheres has received little empirical attention. We analyzed 855 Web of Science publications (2014 to 2025) alongside Baidu Index search data from the Chinese market. The bibliometric record falls into three phases: algorithmic exploration, application development, and scenario empowerment. A qualitative comparison of the two time series shows that the lag between growth in public search interest and growth in academic output appears to have narrowed from roughly 18 to 24 months before 2020 to about 6 to 12 months after 2022, suggesting that the two domains are becoming more closely coupled. Formal causal testing is needed to confirm the direction of influence.

Keywords: Fashion design; AI-generated content; Design innovation; Technology diffusion; Human-AI collaboration

1 Introduction

In technology-intensive manufacturing, the diffusion path from academic research to industry adoption is well mapped and typically follows a measurable lag. In design-driven creative fields, the process may work differently because aesthetic judgment, cultural sensitivity, and craft traditions matter alongside technical performance, yet the question has received little empirical study. The current wave of generative AI in fashion design offers a timely case. In the BoF-McKinsey State of Fashion 2024 survey, 73 percent of executives called it a top business priority, and public platforms are filled with AI-generated garments, trend forecasts, and pattern explorations. Academic research, meanwhile, has focused on model architectures, training regimes, and image fidelity [1, 2]. Both sides agree that AI can assist designers but disagree about where the technology reaches its limits and how labor should be divided between humans and machines [3, 4]. Whether academic output and public interest move in lockstep, whether one leads the other, and whether that relationship is changing are open empirical questions.

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The research based on human-AI design collaboration is thin. Applications keep expanding, covering trend forecasting [7], personalization [8], and sustainable production planning [9], and a rough consensus has formed that color matching and pattern generation suit AI while fabric hand-feel and cultural symbolism call for human judgment [5, 6]. But these task-level observations tell us nothing about how the broader landscape of research and public interest has evolved or whether the two move in tandem. Existing reviews cover only part of the picture: a narrow application [10], a single tool [11], or one technical pathway. None has examined the temporal relationship between scholarly output and public attention. The stakeholder perspective in technology adoption research [12] reminds us that brands, consumers, media, supply chain partners, and regulators all shape how a technology is adopted [13]. A full stakeholder analysis goes beyond the scope of the present study. Still, the multi-actor landscape motivates our choice to examine both formal academic output and informal public search behavior as complementary windows on diffusion.

This study addresses three research questions. What are the publication trends in generative AI fashion design research from 2014 to 2025? What temporal and geographic patterns appear in Chinese public search interest in AI design tools? And are there observable temporal associations between public attention and academic output? Earlier diffusion research has typically relied on a single indicator, either publication counts or market adoption data, to characterize diffusion curves. Pairing the two lets us ask whether the lag structure between academic and public attention is stable or shifting, and what the answer might imply for how creative industries absorb new technologies.

2 Methods

2.1 Data Source and Sample

Answering these questions requires a record of what the research community is producing and what the broader public is paying attention to. We combined three methods. Baidu Index analysis picks up public attention signals. Bibliometric analysis maps the structure and trajectory of academic knowledge production. A GM(1, 1) grey prediction model projects trends forward from historical data as an exploratory exercise. Baidu Index patterns provide context for interpreting bibliometric findings, and the bibliometric timeline serves as a baseline against which shifts in public attention can be gauged.

We measured public attention with the Baidu Index. China had 1.123 billion internet users as of June 2025 (penetration rate 79.7 percent)[14], and Baidu holds a leading position in mobile search. Regarding survey methods, the Baidu Index offers larger sample sizes, real-time availability, and reduced respondent bias [15]. Keywords were organized into two tiers. At the concept level, AI captures foundational technology interest (steady volume since 2014), and AI Painting captures the image-generation domain (which surged after late 2021). At the tool level, we included Midjourney (a leading international commercial platform), Stable Diffusion (a leading open-source model), and Wenxin Yige (a leading domestic Chinese tool). Concept-level keywords support long-run analysis across the full 2014 to 2025 window; tool-level keywords allow a focused look at the post-2022 adoption surge. A limitation of this component needs to be stated up front. These keywords capture general interest in AI image generation; they cannot isolate searches specific to fashion design. We tried fashion-focused terms (“AI 服装设计”, “AI 时装”), but the volumes were