



IMMERSIVE TECHNOLOGIES AND ARTIFICIAL INTELLIGENCE IN THE TRANSFORMATION OF FASHION SALES

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ABSTRACT: The digital transformation of the fashion industry has led to the adoption of augmented reality, virtual reality, and artificial intelligence as strategic tools for improving sales, customer experience, and business sustainability. This paper presents an integrative review of contemporary research and industry practice, analysing the impact of immersive technologies on consumer behaviour and business performance in the fashion industry. Drawing on the stimulus-organism-response paradigm, technology acceptance theories, and the concept of dynamic capabilities, it develops a conceptual framework in which these technologies influence consumer decisions by increasing the sense of presence and perceived value and reducing purchase uncertainty. The results indicate that they can raise conversion rates and potentially reduce product returns, while digital twins and virtual sampling create opportunities for more sustainable processes. The paper examines implementation challenges in small and medium-sized enterprises and proposes a framework for gradual, resource-efficient digital transformation.

Keywords: augmented reality, virtual reality, artificial intelligence, fashion industry, sustainability, fashion metaverse, digital assets (NFTs).

IMERZIVNE TEHNOLOGIJE I VEŠTAČKA INTELIGENCIJA U TRANSFORMACIJI MODNE PRODAJE

APSTRAKT: Digitalna transformacija modne industrije dovela je do primene proširene stvarnosti, virtualne stvarnosti i veštačke inteligencije kao strateških alata za unapređenje prodaje, korisničkog iskustva i održivosti poslovanja. Rad predstavlja integrativni pregled savremenih istraživanja i industrijske prakse sa ciljem analize uticaja imerzivnih tehnologija na ponašanje potrošača i poslovne performanse. Polazeći od paradigme stimulus–organizam–odgovor, teorija prihvatanja tehnologije i koncepta dinamičkih sposobnosti, rad razvija konceptualni okvir prema kojem ove tehnologije utiču na odluke potrošača kroz povećanje osećaja prisutnosti i percipirane vrednosti i smanjenje neizvesnosti pri kupovini. Rezultati ukazuju da one mogu doprineti povećanju stope



konverzije i potencijalnom smanjenju povraćaja proizvoda, dok digitalni blizanci i virtuelno uzorkovanje otvaraju mogućnosti za održivije procese. Rad razmatra izazove implementacije u malim i srednjim preduzećima i predlaže okvir za postepenu i resursno efikasnu digitalnu transformaciju.

Ključne reči: proširena stvarnost, virtuelna stvarnost, veštačka inteligencija, modna industrija, održivost, modni metaverzum, digitalna dobra (NFT).

1. INTRODUCTION

The fashion industry has undergone intensive digital transformation, driven by shifting consumer behavior and the accelerated adoption of digital technologies [1]. Augmented Reality (AR), Virtual Reality (VR), and Artificial Intelligence (AI) have thus evolved from experimental marketing tools into strategic instruments for sales performance and customer experience [2].

The primary challenge addressed by these technologies is the *trust gap* in online fashion retail: consumers cannot physically assess a product's appearance, size, and fit before purchase, which raises perceived risk, lowers purchase intention [3,4], and drives high return rates.

From a strategic management perspective, this study examines how AR, VR, and AI contribute to fashion sales, evaluates the evidence for their effectiveness, and proposes a framework for gradual implementation, with particular attention to small and medium-sized enterprises (SMEs), underrepresented in the literature relative to luxury brands.

2. RESEARCH METHODOLOGY AND THEORETICAL FRAMEWORK

This study applies an integrative literature review, an approach suited to emerging fields with diverse and rapidly evolving evidence [5]. Unlike PRISMA-based systematic reviews, it allows the inclusion of both peer-reviewed publications and industry reports. Publications were identified through Scopus and Web of Science searches on AR, VR, VTO, the metaverse, digital twins, and digital assets in fashion retail, covering studies from 2016-2026 and excluding purely technical work without business or consumer outcomes. Industry reports were treated as a separate evidence category given potential commercial bias. Three cases — Gucci, Burberry, and Louis Vuitton — were purposively selected and assessed by technology, strategic objective, reported outcome, and transferability [6].

The theoretical foundation integrates four complementary perspectives [7-13]. The Stimulus-Organism-Response (S-O-R) paradigm explains how AR and VR act as external stimuli shaping consumers' cognitive and emotional responses, and thus purchase intention, with interactivity, vividness, and telepresence increasing perceived value [3,7,8]. TAM and UTAUT explain the determinants of adoption, where experiential and social benefits often outweigh purely economic considerations [9-11]. Presence Theory highlights the value of immersion alongside limitations such as simulator sickness [12]. The Dynamic Capabilities perspective holds that transformation depends not only on technology investment but on

the ability to sense opportunities and integrate new technologies into existing processes [13].

Figure 1 integrates these strands: AR, VR and digital-twin stimuli act on purchase and firm outcomes through telepresence, perceived value and reduced uncertainty, while AI functions as an enabling layer and firm-level capabilities moderate the outcome.

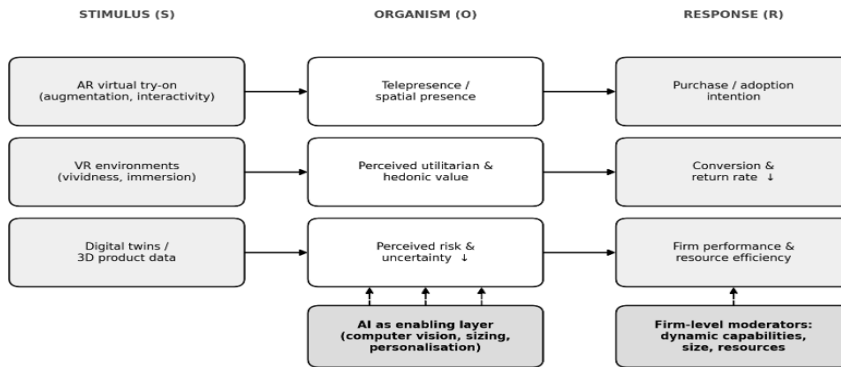


Figure 1: Conceptual model of immersive technology effects in fashion retail [7,8].

3. IMMERSIVE TECHNOLOGIES AS TOOLS FOR SALES DEVELOPMENT

AR is the most mature and widely adopted of the three, largely because it runs on devices consumers already own. Its most prominent application, Virtual Try-On (VTO), lets consumers evaluate clothing, footwear, and accessories in real time; empirical studies consistently show that AR enhances presence, perceived usefulness, and satisfaction, positively influencing purchase intention [3,8,11].

Industry reports also suggest that AR may reduce product return rates. These findings should be interpreted with caution, as they frequently originate from technology providers with a commercial interest in promoting their solutions [14].

VR, by contrast, creates fully immersive environments enabling new retail models — virtual showrooms, digital fashion shows, and fashion metaverses — extending brand reach beyond physical presence. Research nonetheless points to a gap between consumer and corporate expectations: consumers see the metaverse as a space for self-expression, companies primarily as a new business channel [15].

AI functions as the technological foundation integrating these solutions: computer vision enables more realistic AR visualization, while analysis of purchasing and return data supports personalized product and sizing recommendations. Its greatest value lies not in standalone use but in enhancing the accuracy of the other technologies.

4. EMERGING MODELS OF FASHION RETAILING

The development of AR, VR, and AI has produced new retailing models that differ in complexity, required investment, and the strength of the evidence behind them (Table 1).

VTO is the most mature, directly addressing consumers' inability to interact physically with products before purchase [3,8]. Virtual showrooms and digital fashion shows mainly enhance brand visibility and best suit large brands with established identities [15]. AI-driven recommendation offers sales potential but depends on high-quality consumer data, often a constraint for SMEs [2]. Digital twins shorten development cycles and improve traceability, gaining importance under EU initiatives such as the Digital Product Passport [16,17,18]. Digital goods and NFTs remain the most experimental segment: authenticity and exclusivity are established value drivers, but market developments since the initial growth phase warrant caution [19,20].

Table 1: *Comparative assessment of immersive sales models in fashion retail (author's assessment, synthesised from the reviewed literature).*

Model	Investment	Complexity	Effect on sales	Sustainability effect	SME suitability	Maturity
Virtual tryon (VTO)	Med.-high (3D assets/SKU)	Medium	Direct: conv. ↑, returns ↓	Indirect: fewer returns	High	Mature
Virtual showrooms / shows	High	High	Indirect: reach, awareness	Lower travel footprint	Low	Emerging
AI personalisation & sizing	Low–med. (SaaS)	Med. (data-dep.)	Direct: AOV ↑, returns ↓	Indirect	Medium	Mature
Digital twins / 3D sampl.	High upfront, falling/unit	High	Indirect: lead time ↓, cost ↓	Direct: fewer samples	Low–medium	Consolidating
Digital goods / NFTs	Medium	High (reg., technical)	Speculative, post-2022	Ambiguous	Low	Contested
Connected stores	Low–medium	Low-medium	Direct: footfall, basket	Indirect: logistics	High	Mature

5. BUSINESS AND ENVIRONMENTAL EFFECTS

Immersive technologies can improve business performance by raising conversion rates, enhancing customer experience, and reducing purchase uncertainty. Empirical research confirms AR's positive effects on consumer attitudes and purchase intention, though evidence for its effectiveness in reducing return rates remains limited and not independently validated [3,8,11].

Digital twins and 3D modelling improve product development by reducing physical prototyping and shortening cycles [16], though the benefits are not distributed equally across the value chain: a substantial share is often captured by the technology providers themselves.



From a sustainability perspective, these technologies can reduce material consumption, waste, and unnecessary transport while improving traceability [17,18]. Sustainability is not automatic, however: the footprint of the digital infrastructure itself — energy, computing, data storage — must also be counted [16], and robust assessment requires life cycle assessment (LCA).

6. COMPARATIVE ANALYSIS AND IMPLEMENTATION OPPORTUNITIES

Through the *Gucci Garden Experience* and *Gucci Town* initiatives on Roblox, Gucci used digital environments primarily to build brand awareness among younger consumers. The virtual Dionysus handbag's high resale price was an isolated case, not evidence of a sustainable model [21]; the value lay instead in new forms of engagement and expanded digital presence [15].

Burberry's social retail concept with Tencent integrated a physical store with digital content and WeChat into a seamless omnichannel experience [22], demonstrating the potential of physical-digital integration, though transferability is limited by China's specific digital ecosystem and the absence of verified performance data.

Louis Vuitton illustrates VR used to extend global access to fashion shows, though its success depends on the brand's existing market position, which limits applicability to smaller companies.

Technology selection should therefore follow, not precede, strategic objectives, since the same technology can serve purposes ranging from brand awareness to new sales channels. Evidence quality tends to decline as initiatives grow more sophisticated, while applicability declines as resource requirements rise.

For SMEs, the principal barriers are the cost of developing 3D product models, skills shortages, technical constraints, and data protection requirements, making organizational capabilities and resource availability critical determinants of successful transformation [18].

These findings are particularly relevant to the Western Balkan textile industry, predominantly based on OEM and CMT production. Manufacturers typically lack direct customer relationships, behavioral data, and proprietary sales channels, so the feasible direction is digital sampling, digital twins, and traceability, while own-brand companies are better positioned for connected retail.

7. IMPLEMENTATION FRAMEWORK AND RISK MANAGEMENT

Successful implementation requires a gradual approach aligning business objectives with technological opportunities and organizational capabilities. The first stage assesses the current state — return and conversion rates, product portfolio, data availability, and employee competencies — to establish whether the core challenge is product fit or product discovery. A pilot on a limited product range then guides decisions on internal capability-building or external collaboration.

Full implementation requires integrating digital solutions with existing e-commerce, inventory, and enterprise systems, alongside investment in employees' digital competencies, since technology alone is no advantage without the capability to use it [13].



Outcomes should be assessed against defined KPIs: return and conversion rates, average order value, engagement, and model maintenance cost.

Adoption also requires risk management: VTO applications process biometric data, making privacy a key determinant of acceptance [23], alongside algorithmic bias, digital exclusion of consumers with older devices, and data-protection duties. Implementation is therefore iterative: pilot, evaluate, expand where value is demonstrated.

8. CONCLUSION

AR, VR, and AI are becoming increasingly important components of sales development strategy in the fashion industry, their principal value lying in reduced uncertainty and enhanced customer experience. The evidence confirms AR's positive influence on engagement and purchase intention, though its effectiveness in reducing returns and contributing to sustainability remains insufficiently supported. The theoretical contribution lies in linking consumer behavior research with the digital transformation literature through the S-O-R paradigm and dynamic capabilities.

From a managerial perspective, strategic objectives should determine technology selection, and phased pilot-based implementation is more rational than large upfront investment without prior validation. For SMEs operating under OEM/CMT models, digital sampling, digital twins, and traceability systems remain the most promising solutions.

Limitations arise from the integrative nature of the review, the small number of luxury-brand cases, and the absence of primary data. Future research should independently assess effects on return rates, evaluate environmental impact through life-cycle methodologies, and empirically test applicability in the Western Balkan textile industry.

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