Designing Sensory Communication in the Digital Era: Between Tangibility and Virtuality
A Critical Review Through Fashion Retail

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Abstract
This critical review examines sensory communication across physical environments and digital retail channels in the fashion retail sector. It defines "the digital" within a set of e-commerce interfaces, social platforms, and immersive XR/virtual environments, and frames the analysis through semiotics, multisensory perception, material experience, and media theory. The paper argues that current digital experiences complement rather than replace materiality: digital touchpoints amplify access, attention, participation, and decision support, while physical retail remains central for embodied verification and multisensory atmospheres. The analysis concludes with a design framework that maps sensory goals–attention, trust, memorability, desire, belonging to specific touchpoints and outlines compensation strategies and sustainability-conscious implications to consider in the pre-design phases.

Keywords
Sensory communication
Multisensory design
Fashion retail
Phygital retail
Virtual fitting

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Tangible and Immaterial Products in the Digital Era

Contemporary society is becoming progressively dematerialized, as digitalization advances across every field and becomes increasingly evident in everyday life: connections with objects and spaces are gradually giving way to access to networks and platforms, a shift that offers advantages such as time and resource savings, and increased efficiency in processes and management. Yet, as our modes of interaction evolve, so too do the ways in which we perceive and communicate.

Maldonado (1992) anticipates this transition and urges us to reflect on the relationship between emerging technologies and societal implications. He frames digital environments as a complex phenomenon that brings benefits (e.g., broader access to information) as well as challenges, including the digital divide, the loss of tangible experiences, and concerns about security and privacy. Digital environments expand rapidly and — especially for younger generations (Morace & Gobbi, 2025) — become integral to education, work, training, and consumption.

Retail offers a clear arena in which to observe these transformations. The visual landscape of cities shifts along with changes in shop typologies and communication systems. Many traditional shops close permanently, often replaced by standardized services or left vacant, contributing to urban desolation. E-commerce platforms increase convenience and reduce time costs, shifting everyday purchasing practices toward screen-based interactions. Products are delivered directly to homes or routed through pick-up points — often located in "non-places" (Augé, 2018) — moving shopping away from the familiar experience of browsing local shops toward faster, more aseptic, logistics-driven interactions and, consequently, changing the experiential quality of retail.

Yet the physical retail store does not disappear; it continuously evolves. Sales spaces transform in response to social, economic, cultural, and technological changes. Fashion retail provides a particularly emblematic case, because the store operates as a stage that communicates identity, values, and narratives through interiors, displays, products, and embodied rituals. Clothing, more than many other goods, needs to be touched and tried on to be fully appreciated — especially in luxury contexts, in which material evidence, workmanship, fit, and comfort remain central.

Byung-Chul Han (2022) describes a broader shift in which objects increasingly become "non-things," replaced by information. Products circulate as digital representations on screens, quickly consumed and sometimes forgotten. Photo albums, once bound in precious materials, become cloud galleries; printed books, which engage the senses of touch and smell as well as sight, become eBooks consumed primarily through vision alone. These examples illustrate how materiality — through touch, smell, and visual presence — carries communicative density, memory, and affect. In this context, the role of design is to 're-materialize' information, not by simply returning to the physical object, but by designing digital interfaces and phygital interactions that restore a sense of resistance, permanence, and 'affective density' — counteracting the ephemeral volatility associated with purely informational consumption. The key issue is therefore not whether the digital replaces the physical, but how communication is reorganized across a hybrid ecology where each environment contributes its own distinct sensory affordances.

Research Scope, Objectives, and Methodology

To avoid treating "the digital" as an undifferentiated domain, this paper focuses its analysis on three retail-relevant channels that recurrently shape fashion communication. The first is e-commerce interfaces, which encompass web and app-based shopping environments, product pages, and checkout systems. The second is social platforms, including feeds, stories, livestreams, social commerce, and creator ecosystems. The third is immersive XR and virtual environments, such as AR/VR experiences, gaming worlds, and metaverse-like spaces.

Within this scope, the paper aims to elucidate how sensory communication operates across both tangible and digital environments, and to identify implications for design practice. The manuscript adopts a narrative critical review approach integrated with a reportage stance. The review synthesizes foundational contributions from semiotics (Eco, 1978), media theory (McLuhan, 1967; Manovich, 2001), multisensory perception (Spence, 2020), material experience (Ashby & Johnson, 2002; Norman, 2005), and the experience economy (Pine & Gilmore, 1999). The reportage stance is used to interpret widely documented industry developments and flagship initiatives as signals of broader design trends, rather than as outcomes of an empirical experiment.

Theory is bridged with contemporary practice through a curated set of illustrative exemplars drawn from fashion retail and related sectors. These exemplars serve as indicators to clarify hybridization mechanisms and are not presented as empirical case studies. The analysis addresses the following core questions: (i) Which senses are activated in physical retail and in each digital channel, and what types of information and meaning do they support? (ii) What sensory gaps emerge in digital environments — especially regarding touch, smell, and taste — and what compensatory strategies are used to evoke material qualities? (iii) In fashion retail, when does digital communication complement the physical store experience, and when does it risk flattening embodied evaluation and affect? (iv) What design principles can guide hybrid sensory narratives, including sustainability-conscious pre-design strategies?

Theoretical Framework: Sensory Communication Through Four Lenses

The analysis is grounded in a multidisciplinary framework that brings together semiotics, perception, materiality, and media theory. A semiotic perspective (Eco, 1978) posits that every product — whether tangible or virtual — functions as a complex text composed of layered messages with referential and connotative meanings. Within fashion retail ecosystems, spatial cues, furniture, colours, materials, lighting, garments, packaging, and digital interfaces all constitute sign systems that communicate identity and cultural codes. Meaning is generated not by the displayed object alone but by how it is staged within an environment in which signs amplify one another.

This communicative process is tied to multisensory perception and crossmodal correspondences. Physical environments rely on multisensory experiences in which sight, sound, touch, and smell interact to modulate interpretation and memory (Spence, 2020). These dynamics become critical in digital realms, where visual and auditory cues often compensate for the absence of direct haptic input.

The framework also emphasizes material experience and memorability. Human beings remain fundamentally material–relying on tangible objects and spaces for practical activity, emotional attachment, and embodied evidence of quality (Ashby & Johnson, 2002; Norman, 2005). Finally, media theory highlights that perception is shaped by the medium (McLuhan, 1967). Digital media privilege visual–auditory languages and accelerated, scrollable narratives, intensifying attention economies and spectacle (Manovich, 2001). Designers must therefore navigate distinct sensory logics when bridging the physical and the virtual.

Perception and Sensory Communication in Tangible and Digital Realms

In many digital contexts, 2D and 3D images, videos, and digital twins stand in for material products, turning them into instantly consumable information. Communication tools therefore concentrate on visual and auditory stimuli, with limited and mediated haptic interaction. By contrast, physical interactions provide richer sensory evidence because they can involve touch, smell, temperature, weight, and spatial presence.

A simple example illustrates the difference: holding a ceramic cup of hot tea provides tactile feedback through weight, texture, and temperature; its aroma engages smell and anticipates taste, while the ritual itself frames meaning and memory. Digital environments can evoke certain aspects through image and sound, yet the absence of touch, smell, and taste alters the depth and stability of interpretation.

Complementarity Between Physical and Digital Communication in Fashion Retail

Fashion retail has evolved into a hybrid ecosystem shaped by e-commerce, social platforms, and immersive experiences, while physical stores have repositioned themselves as experiential environments. Retail spaces have historically reflected societal transformations: garments act as tools of self-expression and identity, while stores operate as communication platforms that amplify brand narratives through interiors, displays, and service rituals.

The 2000s marked a shift driven by e-commerce and smartphones, which reshaped consumer behaviour and accelerated platform-based forms of communication and consumption. Social media supported storytelling and community cues, while digital fashion expanded into avatar-based environments. At the same time, brands reimagined their physical stores as experience spaces that digital channels cannot fully replicate, driving the spread of pop-up formats

and site-specific activations. Digital layers — interactive displays, virtual try-ons, augmented reality, and QR-code bridges — are increasingly integrated into physical spaces, enabling omnichannel continuity without duplicating the same experience across every touchpoint.

Illustrative Exemplars (Evidence Pointers)

Adjacent sectors illustrate how virtual artefacts can amplify desire while physical instantiation restores material evidence. A telling example is the *Ferrari Vision Gran Turismo*, a concept designed for virtual motorsport. In the digital realm, carefully crafted visual and sound cues function as sensory proxies for performance and mechanical presence. The strategy extends beyond the screen through the display of a full-scale model, restoring scale, surface, and aura — key drivers of trust and memorability within material culture (Ferrari, n.d.; Gran Turismo, n.d.).

In fashion, physical–digital crossovers occur when exhibitions translate into participatory virtual environments. The *Gucci Garden Archetypes* project extended its physical exhibition into a Roblox experience in which avatars interact with exhibition elements. This translation shows how meaning migrates from the material atmosphere of a gallery to interactive visual codes and social visibility, strengthening the sense of belonging and participation through a distinct form of identity performance (Gucci, n.d.).

Hybrid retail activations also demonstrate how physical sensory experiences and digital environments complement one another. The *Balenciaga* × *Fortnite* collaboration connects virtual "skins" with curated physical retail touchpoints through limited-edition products and coordinated communication. The virtual layer expands visibility and participation, while the physical layer provides tactile evidence and quality cues, anchoring digital desire to material verification (Fortnite, n.d.).

Pop-up culture offers an early precedent for sensory intensification. The *Comme des Garçons Guerrilla Store* in Berlin (2004) exemplifies how temporariness itself becomes a communicative strategy: unconventional locations and limited duration can increase attention and memorability while preserving tactile evidence and embodied encounter (Winterhalter, 2012). Building on site-specificity, other retail experiences amplify synesthetic communication by making the environment part of the message.

The North Face Mountain Festival activation in the Dolomites frames brand heritage through embodied effort, climate, and landscape; authenticity emerges as sensory evidence that digital platforms can amplify through storytelling but cannot replicate (Frajese, 2018).

Finally, retail innovation shows how 3D body scanning, AR fitting, and AI-driven recommendations increasingly function as decision-support infrastructures rather than substitutes for material evaluation. By reducing size uncertainty and enabling pre-selection, these tools contribute to phygital experiences that connect mobile interfaces with in-store interaction, while physical try-on remains the decisive moment of verification for comfort, texture, and embodied fit (Zara, n.d.). More broadly, omnichannel research emphasizes

cross-touchpoint continuity as a key driver of customer experience and decision-making (Vinoth & Srivastava, 2024). In practice, flagship ecosystems such as the *Nike House of Innovation* exemplify how immersive scenography, service design, and app-enabled personalization can transform the store into a participatory environment in which brand identity is communicated through atmosphere, interaction, and community-oriented rituals (Nike, n.d.).

The Role of Design in Sensory Communication

Designers convey messages through tangible objects and intangible digital creations by organizing systems of signs that are perceived through sensory engagement (Eco, 1978). Because the medium shapes how a message is perceived (McLuhan, 1967), the migration of retail communication toward interfaces, platforms, and immersive media transforms how meaning, trust, and memorability are constructed. Under current conditions, design practice therefore consists in orchestrating hybrid sensory narratives: aligning what is communicated with the affordances and constraints of each touchpoint and ensuring coherence between digital sign systems and material evidence. This perspective shifts the design focus from choosing between physical and digital channels to composing integrated experiences in which each touchpoint contributes distinct sensory information and reinforces the overall brand narrative. This approach directly informs the design framework proposed below.

Design Framework: Orchestrating Sensory Strategies in Hybrid Retail

To provide a concrete contribution to design knowledge, this paper proposes a framework that orchestrates sensory goals across retail touchpoints by aligning brand objectives with channel-specific affordances. Designers can define five recurring sensory goals: attention (capturing interest), trust (evidence of quality), memorability (distinctive recall), desire (emotional resonance), and belonging (identity and community). These goals are not supported equally across channels. E-commerce typically sustains attention and partial trust through information density (images, zoom, reviews, policies) yet remains weak in terms of embodied verification; social platforms sustain desire and belonging through storytelling and community cues; immersive XR environments strengthen memorability and belonging through spatial narratives and avatar participation. Physical retail remains decisive for trust and high-impact memorability through material evidence, atmospheres, and interpersonal rituals.

The analysis of current exemplars suggests four integrated strategies to achieve these goals: (i) Sensory substitution: digital channels compensate for absent senses–touch/smell–by translating material cues into screen-based "proxies". These include visual materiality (macro textures, drape videos), narrative materiality (storytelling around craft and provenance), and crossmodal cues in which sound serves as a metaphor for texture. (ii) Sensory amplification: physical spaces (flagships and pop-

ups) intensify atmospheres and staged experiences. Here, site-specific conditions — such as the temporal scarcity of *Comme des Garçons Guerilla Store* or the physical effort demanded by *The North Face* — amplify trust and memorability through embodied proof. (iii) Identity performance: social and immersive XR environments support belonging through avatar self-representation and community cues. While predominantly visual and auditory, these platforms strengthen brand meaning through participatory rituals and peer visibility. (iv) Continuity loops: hybrid experiences build explicit bridges — such as QR codes, shared narratives, and limited-edition physical/digital drops (e.g., *Balenciaga* × *Fortnite*). Each realm contributes distinct evidence: physical spaces provide tactile validation, while digital layers extend narrative continuity and circulation.

This orchestration carries significant sustainability-conscious implications. By framing virtual try-on and data-driven personalization as pre-design infrastructures, brands can support informed selection and potentially reduce return rates without eliminating the essential embodied verification provided by the physical encounter. Ultimately, this hybrid approach advocates for a synergistic narrative in which each touchpoint offers distinct sensory evidence, avoiding content duplication in favour of a coherent, multi-layered brand experience.

Conclusion

This critical review examines sensory communication across physical and digital retail environments, focusing on fashion retail as an emblematic field in which meaning, identity, and desire depend strongly on multisensory cues. By distinguishing three forms of "the digital" — e-commerce interfaces, social platforms, and immersive XR/virtual environments — the paper demonstrates that each channel activates specific sensory modalities and therefore communicates different types of meaning. Screens concentrate communication in visual and auditory languages and fast narrative forms, while physical stores enable synesthetic experiences and embodied verification through touch, smell, spatial presence, and interpersonal ritual.

The analysis supports a complementary interpretation: under current technological conditions, digital environments do not replace the communicative power of materiality, but extend hybrid retail ecologies by amplifying access, attention, participation, and decision support. The exemplars show how virtual channels expand reach and desire, while physical settings restore evidence, aura, and embodied memory. Meanwhile, phygital infrastructures (3D body scanning, AR fitting, AI recommendations) strengthen personalization and may reduce size uncertainty and returns. The typology clarifies how these dynamics recur as sensory substitution, sensory amplification, identity performance, and continuity loops. The design challenge therefore lies in weaving integrated sensory narratives that respect the affordances of each realm and support compelling and responsible retail strategies, including sustainability-conscious pre-design processes in which digital tools assist informed selection, while physical encounters preserve decisive tactile verification.

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