Dealing with Objects, Dealing with Data.
The Role of the Archive in Curating and Disseminating Fashion Culture through Digital Technologies

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Abstract

The article aims to outline innovation trajectories emerging from the integration of digital technologies within fashion culture-intensive domains, especially when dealing with historicized fashion heritage preserved within an archive. Indeed, despite the technologies' potential in unfolding the cultural artefacts' tacit knowledge to rethink fruition and production practices in fashion cultural domains, technological applications within these fields remain not integrated and their experimental attempts pedagogical and superficially descriptive. Through an understanding of the logics underlying the development of new media languages and human-computer interactions, knowledge arising from close readings of archival objects, as well as from distant readings of digital records, will highlight the potential related to the disclosure of knowledge preserved and collected in the archive. Following the Design Orienting Scenarios approach, the archive will serve as the context to develop innovation trajectories to appropriately redefine existing cultural expressions and visualize future cultural patterns for the fashion field.

Keywords: Augmented Archive; Fashion Heritage; Digital Technologies; Object-Driven; Data-Driven.

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The Archive as a Design Tool for Digital Innovation

The body of tangible and intangible knowledge growth from the sets of historical and cultural practices fashion embeds feeds into what is defined as fashion heritage, serving as the outcome and activation of production and consumption processes of goods and services within the fashion system.[1] As an intersection of past, present, and future practices, the archive arises from the fundamental urge to preserve fashion heritage as memories of a person, a social group, a location, or an organisation. Indeed, culture-intensive objects, fashion ephemera, industrial processes and traditional fashion practices become heritage when preserved and collected in archives and serve as study objects and triggers for dissemination activities, meaning and behavioural innovation.[2] Overtime, research practices revolving around the archive have been made possible thanks to a wide range of fashion archives scattered among companies, museums, foundations, universities, and special private collections, based on the type of objects and information architecture they enclose, representing one of the largest patrimonies worldwide in the field of Cultural and Creative Industries (CCI). According to the *Sistema Archivistico Sistema Informativo Unificato per le Soprintendenze Archivistiche* (SIUSA)[3] and the *Portale degli Archivi della Moda del Novecento*,[4] Italy only, on its own, has more than 540 fashion archival complexes partaking in defining the national identities, both connected to Italian manufacturing history and its contemporary production system.

The collection of artefacts preserved in a fashion archive usually includes a wide range of documentation related to design inspirations, studies on shapes and functionality, illustrations and sketches, paper patterns and prototypes, research on materials and development of colour variants, studies for the development of fashion design details, patents, collection of advertising campaigns, photographic artwork, and press releases. Nevertheless, over time archives, serving as places for meticulous preservation, have been governed by elitist and exclusive ideals, distant from the general public,[5] where direct access continues to be obstructed.[6] Digitalisation in the field has profoundly changed the means of access to archival content since it is ontologically tied to immateriality and ideas of free access, sharing, the democratisation of knowledge, and participation. Indeed, the agencies of digital technologies have brought the urgency to connect physical repositories to virtual platforms in which such memory is guarded and preserved.[7] Within this context, educators, students, designers, and industry members can tell stories about fashion using resources from multi-vocal archival materials.[8] Interpreted as such, an archive becomes an instrument of symbolic innovation[9] that, through an orientation and understanding of the possibilities derived from digital media, can set the material and production culture of an enterprise, becoming "a

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1. Marcella Martin and Federica Vacca, "Heritage Narratives in the Digital Era: How Digital Technologies Have Improved Approaches and Tools for Fashion Know-How, Traditions, and Memories," *Research Journal of Textile and Apparel*, Vol. 22, no. 4 (1 January 2018): 335–51, https://doi.org/10.1108/RJTA-02-2018-0015; Angelica Vandi, "Digitalising Fashion Culture: Impacts on Historicised and Contemporary Production and Consumption Practices," in *Storytelling. Esperienze e Comunicazione del Cultural Heritage* (Bologna: Bologna University Press, 2022), 309–19.

2. Marco Pecorari, "Fashion Archives, Museums and Collections in the Age of the Digital," *Critical Studies in Fashion & Beauty*, Vol. 10, no. 1 (2019): 3–29, https://doi.org/10.1386/csfb.10.1.3_7.

3. "SIUSA: Sistema Archivistico Sistema Informativo Unificato per le Soprintendenze Archivistiche," accessed February 27, 2023, https://siusa.archivi.beniculturali.it/.

4. "Portale Archivi della Moda del Novecento," accessed February 27, 2023, https://icar.cultura.gov.it/sistemi-e-portali/portali-tematici/archivi-della-moda-del-novecento.

5. Charles Merewether (ed.), *The Archive. Documents of Contemporary Arts* (London, Cambridge (MA): Whitechapel and The MIT Press, 2006).

6. Jeffrey Schnapp, "Animating the Archive," *Design & Cultural Heritage*, 2 vol., I: *Archivio animato* (Milan: Mondadori Electa, 2013), 63–80; Valentina Rossi, "Digital Humanities e Moda," *ZoneModa Journal*, Vol. 10, no. 2 (22 December 2020): 43–59, https://doi.org/10.6092/issn.2611-0563/11838.

7. Pecorari.

8. Anne Peirson-Smith and Ben Peirson-Smith, "Fashion Archive Fervour: The Critical Role of Fashion Archives in Preserving, Curating, and Narrating Fashion," *Archives and Records*, Vol. 41, no. 3 (1 September 2020): 274–98, https://doi.org/10.1080/23257962.2020.1813556.

9. Chiara Colombi and Federica Vacca, "The Present Future in Fashion Design: The Archive as a Tool for Anticipation," *Zone Moda Journal*, no. 6 (December 2016): 38–46.

transformative/generative tool which focuses not only on shaping logical perceptive processes of reinterpretation of documentation and artefacts, but also profoundly influences how actions and relationships between artefacts, stimuli, inspirations and contemporaneity are conceived, designed and planned."[10] Going in-depth, the digitisation of collections impacts a wide range of contexts and approaches concerning the acquisition and representation of fashion heritage. It implies a complete and necessary redefinition of archives as digital repositories[11] such as (i) incorporating technological solutions to reorganise archival methods and acquisition practices, (ii) rethinking fashion curatorial practices with new modes that expand and hybridise the physical and digital dimensions of fashion cultural heritage, and (iii) introducing digital apparatuses and devices to stage artefacts of a heterogeneous and ephemeral nature. Traditionally, curatorial approaches have always focused mainly on representing knowledge belonging to historical collections through the medium of the exhibition,[12] placing the artifact at the centre of a chronological perspective and keeping it as the starting and ending point of their narrations. Consequently, the intangible and tacit knowledge that shapes and belongs to the object itself has often been overlooked and not thoroughly represented and narrated, as well as the transversal interconnections that the object has thanks to its situatedness in a wider socio-cultural, historic context. Considering these concerns, traditional curatorial approaches need to take into consideration the multimodal affordances enabled by digital technologies, that can empower users to go in depth into object's tacit knowledge and to unveil interconnections with external facts and other bodies of cultural data, with the goal of providing them with immersive and extended experiences.[13] On the other hand, what is defined as "digital curation"[14] is aimed at preserving, managing and adding value to digital archival data throughout its lifecycle and overtime for current and future generations of users, to generate new sources of continuous and immediate information and knowledge dissemination.[15] This approach introduces an intriguing perspective regarding the transformative impact of technological media on the very essence of knowledge. With the digital, knowledge permeates every aspect of our lives, becomes universally accessible, allowing for an expansive realm of information to be explored. Therefore, the challenge of fashion curation is to merge these essential dimensions to provide holistic experiences where digital records interact in unique and innovative ways within the physical realm to provide innovation directions in cultural and creative domains. This view moves beyond the traditional technocratic belief that considers innovation as distanced from the past and different from the present. It also favours temporality and historical and cultural stratifications as tools required to design the future we desire and make it present. Within this context, the archive undergoes a transformative process, liberating itself from its conventional perception as a static and antiquated entity. Instead, it evolves into a dynamic system of design practices, serving a dual purpose. Firstly, it enables the reinterpretation of fashion heritage from multiple perspectives and facilitates its dissemination through augmented fruition dynamics, all while safeguarding its authentic identifying codes. Simultaneously, it paves the way for the development of new design pathways, capitalizing on contemporary production potentials to reexamine and bring to life historical and cultural practices. Consequently, the archive transcends its traditional boundaries, assuming the form of an animated or mixed reality archive.[16] As a potent design tool, it establishes a comprehensive framework for the creation, transfer, and preservation of diverse values, employing various tools, media, and levels of engagement.

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10. Colombi and Vacca, 41.

11. Agnès Rocamora, "Mediatization and Digital Media in the Field of Fashion," *Fashion Theory*, Vol. 21, no. 5 (3 September 2017): 505–22, https://doi.org/10.1080/1362704X.2016.1173349.

12. Germano Celant, ed., *Il Tempo e La Moda* (Milan: Skira, 1996).

13. Pecorari; Federica Vacca and Angelica Vandi, *Fashion Archive as Metamedium. Unfolding Design Knowledge through Digital Technologies* (Antwerp: Cumulus, 2023).

14. Maria Cassella, "Il digital curator," *Biblioteche oggi*, Vol. 31, no. 6 (9 July 2015): 3, https://doi.org/10.3302/0392-8586-201306-003-1.

15. Cassella, 3.

16. Schnapp; Gabriella Giannachi, *Archive Everything: Mapping the Everyday* (Cambridge (MA): The MIT Press, 2016).

Dealing with Objects. Digital Media and Close Readings of Archival Objects

Archival heritage has typically been activated in curatorial practices through approaches related to preserving, improving, and promoting its tangible components.[17] These methods and techniques usually appear conservative and traditional in how they approach museums' displaying phase. Approaches that are also reflected online through websites that serve as digital research platforms showcasing a juxtaposition of objects or descriptions, primarily devoid of contextual elements and reciprocal relations that are not entirely extrinsic and based on elements that are not always meaningful, without an effective integration of the various disciplinary fields involved in and for a fashion artefact.[18] Furthermore, the inner knowledge inherently linked to Intangible Cultural Heritage (ICH) concerning techniques, processes, sociocultural narratives and meanings stayed permanently implicit in artefacts and preserved within archives and collections because it is challenging to display and access by public audiences. Traditional curatorial approaches lack a close reading of the fashion historical object[19] that enables to grasp tacit dimensions that remain unfold whether the object is seen as static behind a vitrine in a museum or through an image picturing its bidimensional silhouette. One of the crucial aspects that remains unexplored is the concept of movement. Within the realm of fashion design, movement holds significant importance as it serves as a focal point for studying the interplay between garments, accessories, and the human body. This exploration involves the careful selection of textiles, fabric choices, and the intricate process of pattern-making and draping. Currently, extensive research in both the fashion industry and the field of human-computer interaction concentrates on rediscovering knowledge pertaining to how clothing items can adapt and respond to the body's movements. The objective is to amplify self-expression by reintroducing the dynamic element into fashion design,[20] transcending the limitations of physical form and preservation requirements. Indeed, software and interfaces can escape the screen's bidimensional surface and implement a "virtual depth"[21] through an augmented implementation and perception of immaterial content like movement. This could be a precious source of knowledge for digital curatorial practices, although little is explored from a "representation" point of view.[22] Indeed, users could live an extraordinary experience seeing the garment in motion and interacting with it through insights that often stay unfolded and invisible, especially to non-professional users. Online platforms like the Virtual Fashion Archive[23] or the Central Saint Martin project *Exploding Fashion*[24] are undertaking the innovative trajectory enabling kinetic from the archival artefact, leveraging on the opportunities derived by virtual prototyping software like CLO3D[25] to study objects through reverse engineering methods[26] and reconstruct them into animated digital doubles that closely mirror the original form. The clothes may now be seen and enjoyed regardless of where the physical item may be, at any time, by making the collection available online. Following the reality-virtuality continuum theorised by Milgram and Kishino,[27]

17.   Giorgio Riello, "The Object of Fashion: Methodological Approaches to the History of Fashion," *Journal of Aesthetics & Culture*, Vol. 3, no. 1 (January 2011): 8865, https://doi.org/10.3402/jac.v3i0.8865.

18.   Daniela Calanca, "Archivi digitali della moda e patrimonio culturale tra descrizione e integrazione," *ZoneModa Journal*, Vol. 10, no. 2 (22 December 2020): 11–25, https://doi.org/10.6092/issn.2611-0563/11793.

19.   Vacca and Vandi.

20.   Lise Amy Hansen and Andrew Morrison, "Materializing Movement—Designing for Movement-Based Digital Interaction," *International Journal of Design*, Vol. 8, no. 1 (2014): 29–42.

21.   Tobias Ebsen, *Material Screen: Intersection of Media, Art and Architecture*, Ph.D. dissertation (Aarhus: Aarhus University, 2013).

22.   Hansen and Morrison.

23.   "Virtual Fashion Archive, Superficial Studio," accessed February 27, 2023, https://virtualfashionarchive.com/.

24.   Alistair O'Neill, *Exploding Fashion: Making, Unmaking, and Remaking Twentieth Century Fashion* (Tielt: Lannoo, 2021).

25.   "CLO3D," accessed February 27, 2023, https://www.clo3d.com/en/.

26.   Vacca and Vandi.

27.   Paul Milgram and Fumio Kishino, "A Taxonomy of Mixed Reality Visual Displays," *IEICE Trans. Information Systems* E77-D, no. 12 (1 December 1994): 1321–29.

the motion dimension could be enhanced and further explored when applying Mixed Reality technologies to the archival digital twin. Indeed, virtual projections like holograms could directly appear in the physical space allowing users to live futuristic performances just by wearing head-mounted displays. Despite still not being explored and employed within fashion contexts, museums like the Victoria & Albert in London are starting to reflect on these possibilities. SONZAI, designed and implemented by Dimension Studio in the museum, is a mixed-reality dance performance employing the avatar of the performer Maëva Berthelot in a stunning audio-visual live experience perceived through visors.[28]

Along with motion, another dimension that by nature belongs to fashion artefacts is the materiality of textiles and materials, tightly linked to the sense of touch. The preservation and collection of costumes and other textiles in museums do not symbolise the apex for disseminating the cultural heritage of textiles.[29] As anticipated, fashion archival objects witness material culture, especially in the Italian landscape, reflected in heterogeneous artisanal know-how and industrial predisposition toward endless manufacturing innovation. Indeed, fashion heritage encompassed a wide variety of textiles derived from various raw materials and characterised by craftsmanship techniques in weaving and assembling as well as embroidery, embellishments and post-production processing which can only be observed translated on an object in a museum or through a photograph and narrated by a textual description. Moreover, ICH is in danger of disappearing due to socio-cultural, economic, and technological barriers that lead to outsourcing, homologation and depauperate. In this context, digital technologies could preserve, revive, transmit and valorise ICH's "creative acts" by encoding data, information, and knowledge.[30]

Modern software applications can expand our understanding of the complexity and variety of artefacts, their creation, and the evolution of different craft traditions, providing fresh insights and viewpoints relevant to traditional crafts and ancient societies. Digital curatorial practices aimed at unfolding craft techniques belonging to textiles and fabrication can manage the integration of virtual experiences involving the sense of touch, even if a screen mediates physicality, be it a smartphone, tablet, laptop, or desktop device. Indeed, haptic devices and low-tech haptic visuality films could be applied to give a hand or finger tactile input in virtual reality, and hyper-sense encoded data for memory elicitation. By delivering "perceptual cues in the form of forces, displacements, electrical, thermal, or other signals delivered to the skin and body,"[31] haptic interfaces for human-computer interaction, virtual reality, and human-robot interaction may improve the sense of touch that is crucial to perceive the materiality of the fashion artefact completely. This is the objective of Wint Design Lab's *XYZ | Sensomotoric Interplay of Glass and Body*,[32] a research project which delivers visual and material reinterpretations of the craftsman's specific movements and the physical resonance within a glass-blown piece. Another best practice belonging to the artistic field that experiments with the translation of human perceptual cues to machines are the Mutations of Presence performance by the artist and researcher Sougwen Chung,[33] investigating creative co-creation through collaborative improvisational drawing with a collaborative robot trained on the artist's movement when drawing. The exploration and initial endeavors at the intersection of Cultural Heritage and HCI domains contribute to the emergence of novel design frameworks that prioritize the production aspect of fashion items. These efforts shed light on the potential that arises from the accessibility of various technologies, ranging from 3D printing, a digital manufactur-

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28. "SONZAI at the V&A: The Future of Performance," accessed February 27, 2023, https://www.dimensionstudio.co/work/sonzai-va-dance-future-of-performance.

29. Eva Andersson Strand, Stefan Lindgren and Carolina Larsson, "Capturing Our Cultural Intangible Textile Heritage, Mo-Cap and Craft Technology," in *Digital Heritage. Progress in Cultural Heritage: Documentation, Preservation, and Protection*, ed. Marinos Ioannides et al. (Cham: Springer International Publishing, 2016), 10–15, https://doi.org/10.1007/978-3-319-48974-2_2.

30. Daria Casciani and Angelica Vandi, "Hyper-Sensing Creative Acts the Role of Design in Transmitting Intangible Cultural Heritage through Digital Tools," *PAD: Pages on Art and Design: Digital Memories*, Vol. 15 (December 2023): 227–52.

31. Mengjia Zhu et al., "Soft, Wearable Robotics and Haptics: Technologies, Trends, and Emerging Applications," *Proceedings of the IEEE* 110, no. 2 (February 2022): 246–72, https://doi.org/10.1109/JPROC.2021.3140049.

32. WINT Design Lab, "XYZ | Sensomotoric Interplay of Glass and Body," accessed February 27, 2023, https://tacitdialogues.com/.

33. Sougwen Chung, "Mutation of Presence," accessed February 27, 2023, https://sougwen.com/project/mutationofpresence.

ing technique, to cutting-edge collaborative robotics. Presently, these applications are primarily being pioneered in artistic and engineering settings, opening new possibilities and opportunities.

Dealing with Data. Algorithms and Distant Readings of Archival Collections

While there has been extensive academic research on fashion curatorial practices[34] and the digitalization of fashion domains,[35] the conversation surrounding the digital's impact on archives and museums has predominantly been confined to disciplines such as library science, museum studies, and digital humanities practices,[36] with the result that what is often lacking is a true valorisation and sharing of knowledge from the specific domain to a more general sphere that gives rise to new forms or new levels of knowledge from their intertwining and integration. The fashion cultural heritage is still fragmented in preservation and distribution, failing to convey the complexity of knowledge, forms, and methodologies. As Calanca describes, there is a need to integrate and make digital descriptions and reproductions interact with broader knowledge, a knowledge that refers to the overall contexts in which those objects were brought into being and then subsequently preserved, used and interpreted.[37] In this context, the discipline of design, knowing about "the artificial world of artefacts,"[38] and being by nature the result of the encounter between techno-scientific and socio-cultural domains, offer deep reasoning on the possibility of using digital technologies to integrate explorations around heritage objects (as explored in the previous section) with methods derived from information science and visualisation aimed at unfolding knowledge from heterogeneous networks of data arising from fashion collections. Indeed, "if online digitalised collections can become resources for designers and professionals, they are today becoming central design tools for fashion scholars and researchers as well"[39] who need to reflect on and hybridise with the languages underlying data and information visualisation, and the criteria to apply when curating archival collections online to glean information and knowledge from digital records. Visualisation, a distinctive feature of the digital humanities,[40] involves by nature computational methods like algorithmic reading to expand the scope and capacity of visual and textual analysis that can be applied to an archival collection involving large amounts of data. Also referred to as "digital visualisations,"[41] they are the result of computational methods applied to cultural data[42] that analyse thousands of data and characters within text and file metadata, thus enabling a new kind of language and narrative based on distant reading. In fact, unlike close human reading, which deals with a canonical reading of a few objects examined in detail, distance reading requires the digital processing of vast corpora, made up of much smaller units but much more substantial in terms of content. A human cannot do this, and it fundamentally alters the purpose of reading. It shifts from a "document-centered" approach, which involves in-depth analysis of an object or text while maintaining its structure, to a focus on generating an abstract view that visualizes the overall characteristics of one or multiple texts.[43] Algorithms identify patterns, which are then transformed into spatial configurations using reduction and similarity as visual

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34.   Judith Clark and Amy de la Haye, *Exhibiting Fashion: Before and After 1971* (New Haven: Yale University Press, 2014); Annamari Vänskä and Hazel Clark, *Fashion Curating: Critical Practice in the Museum and Beyond* (London: Bloomsbury, 2017).

35.   Rocamora.

36.   Anne Burdick et al., *Digital_Humanities* (Cambridge (MA): The MIT Press, 2012).

37.   Calanca.

38.   Nigel Cross, *Designerly Ways of Knowing* (London: Springer, 2006), 1–13, https://doi.org/10.1007/1-84628-301-9_1.

39.   Pecorari, 21.

40.   Franco Moretti and Oleg Sobchuk, "Hidden in Plain Sight," *New Left Review*, no. 118 (9 August 2019): 86–115.

41.   Lev Manovich, "What Is Visualizartion?," 2010, http://manovich.net/content/04-projects/064-what-is-visualization/61_article_2010.pdf.

42.   Lev Manovich, *Cultural Analytics* (Cambridge (MA): The MIT Press, 2020).

43.   Stefan Jänicke et al., "On Close and Distant Reading in Digital Humanities: A Survey and Future Challenges," *EuroVis 2015: The EG/VGTC Conference on Visualization* (Cagliari: EuroVis, 2015).

translation and schematization parameters that generates knowledge through interaction with users. This approach also presents an opportunity for the necessary systemic innovation of the fragmented fashion heritage landscape. It involves connecting the collection to a wide range of other evidence, creating a "scopic view"[44] that goes beyond a single entity. This overview of data highlights potentially interesting patterns and hyperlinks,[45] allowing for research queries, skimming, keyword filtering, and a scalable drill-down approach to further explore the presented patterns. By combining data-driven interdisciplinary approaches and material culture analysis, fashion can be viewed both as an object-focused topic and something that can be meaningfully reflected in digital archive records. This integrated approach offers a more nuanced understanding of the socio-cultural and socio-economic contexts related to the visual and heritage aspects of fashion.[46] Although best practices using computational analysis are still rare and not meaningful within the fashion field, the virtual archive IN-COMMON provides an engaging experiential narrative of performing arts in Italy based on algorithmic pattern recognition that highlights the connections of materials across time and space, artists and events, geographies, and specific metadata of textual documentation.[47] In these narratives, humans engage with visualized data, enabled by algorithmic contributions that offer new modalities and possibilities. As Esposito notes, algorithms are unique in their "noisy" nature, identifying patterns and connections that elude human observers, thereby shaping interpretive readings and raising fresh questions.[48] The machine assumes the role of a partner, suggesting new directions for interpretation. This notion of hyper reading extends to what Hayles terms "machine reading"[49] where artificial intelligence utilizes data mining techniques to autonomously generate new artifacts, either from human input or through unsupervised approaches. This trajectory of linguistic innovation embeds AI agency in cultural production, intimately understanding human aesthetic preferences and merging with various fields like modelling, gaming, adaptation, translation, rendering, and simulation. The boundary between human interpretation and autonomous recognition becomes blurred and permeable. As a computer technology mirroring human behavior, AI has already made significant strides in the fashion industry making the boundary between human interpretation and autonomous recognition undefined and porous. As a computer technology that acts as a tool to mirror human behaviour,[50] AI has already paved its way in the fashion industry. To date, the advent of text-to-image, drawing-to-image, and image-to-3d AI-powered platforms such as Midjourney[51] or Dreamstudio[52] act as self-learning machines by processing significant quantities of information and analysing that information to create new inspirations and outputs useful in fashion ideation processes.

Conclusions and Discussion

The Interpretive Framework: The Design Orienting Scenario Approach

The context described in the previous sections makes it possible to apply a scenario design approach as a fundamental methodology for defining and describing an environment within which a project will be placed and for identifying experiential design trajectories to be followed.

44.   Leticia Bode, "Facebooking it to the Polls: A Study in Online Social Networking and Political Behavior," *Journal of Information Technology & Politics*, Vol. 9, no. 4 (1 October 2012): 352–69, https://doi.org/10.1080/19331681.2012.709045.

45.   N. Katherine Hayles, "How We Read: Close, Hyper, Machine," *ADE Bulletin* (2010), 62–79, https://doi.org/10.1632/ade.150.62.

46.   Peirson Smith.

47.   IUAV, "IN-COMMON," accessed February 27, 2023, https://in-common.org/.

48.   Esposito.

49.   Hayles, 74.

50.   Caen A. Dennis, "AI-Generated Fashion Designs: Who or What Owns the Goods?," *Fordham Intellectual Property, Media and Entertainment Law Journal*, Vol. XXX, no. 2 (2020): 593–644.

51.   "Midjourney," accessed February 27, 2023, https://www.midjourney.com/home/.

52.   "Dreamstudio," accessed February 27, 2023, https://dreamstudio.com/create/.

According to the directions and assumptions provided in the previous sections based on the literature review and evidence observations, as well as on the informed perspective concerning the archive as a catalyst for symbolic innovation in the fashion field both from a cultural and technological dimension, the proposed innovation trajectories are based on a Design Orienting Scenarios (DOS) approach.[53] DOS were developed outside future studies and strategic planning to involve the world of design closely, thanks to narrative and visual representations of trends and contexts. They are fundamental results for describing an environment within which a project will be placed and for identifying design trajectories to follow.[54] Following DOS, four trajectories are described and developed following the 2X2 Matrix Technique based on a four quadrants scheme defined by two pairs of variables.[55] Each variable ranges along two polarities to understand the nature of potential design directions in fashion culture and new media technologies. On the *drivers of the highest importance* axis, the variables represent the nature of artefacts within an archive ranging from *object-driven immersion*, with tangible artefacts as the subject of analysis, to *data-driven immersion*, considering digital archival records the starting point for new narratives. On this axis, immersion in cultural pieces and works of art as the modern model of sensory perception makes the experiential aspect prevail over the aesthetic one.[56] On the other axis, the variables related to the *driver of the highest uncertainty* represent the dimensions that technology's agency could impact within fashion environments, ranging from *augmented fruition* through the act of dematerialisation — as an object or data breakdown in order to access tacit knowledge dimensions — to *augmented production* thanks to the capabilities of new technologies to rematerialise cultural artefacts through human-computer interactions, translating the techniques and know-how implicit in archival objects for advocacy and preservation.

The Outlined Innovation Trajectories

There are several methods to view and read archival fashion as a result of technological approaches hybridizing fashion heritage practices in light of changes in design languages. Based on the theoretical scenario depicted above and the several realities that are currently moving to establish new systems of disseminating cultural heritage, the four trajectories are here proposed and described, taking into consideration contexts, agencies, relationships and opportunities derived, within the scope of the 2X2 matrix.[57]

The trajectory traced by the *augmented fruition through object-driven immersion* concerns the unfolding of tacit knowledge of culture-intensive fashion artefacts through close readings enabled and augmented by digitalization practices aimed at dematerializing archival collections.[58] Phygital curatorship practices will allow users to fully experience and acquire the multi-layered dimensions related to pattern making and kinetics deeply characterizing fashion design processes. An initial attempt is represented by the Virtual Fashion Archive[59] that chose Thierry Mugler's designs or the animations of the pleated volumes of Issey Miyake's garments kept at the Museum at FIT as digital twins to show close-ups of specific structural details, seams, textures, and embroidery. This process enables the creation of Mixed Reality environments where the physical object is supported by immersive digital environments that add

53. Ezio Manzini, François Jégou and Meroni Anna, "Design Oriented Scenarios: Generating New Shared Visions of Sustainable Product Service Systems," *Design for Sustainability. A Step-by-Step Approach* (Paris and Delft: [UNEP, DTIE, Sustainable Consumption and Production Branch], 2009).

54. Danila Zindato, "Approaches and tools for building the future within design processes," PhD dissertation (Milan: Politecnico di Milano, 2016).

55. Alun Rhydderich, "Scenario Building: The 2x2 Matrix Technique," (Paris: Futuribles International, 2017).

56. Modesta Di Paola and Daniel Lesmes, "Gli interstizi dell'immersivo. Politiche espografiche e pratiche artistiche," in *Atmosfere. Esperienze Immersive Nell'arte e al Museo*; Alessandra Vaccari, Paolo Franzo and Giulia Tonucci, "Mise En Abyme. L'esperienza Espansa Della Moda Nell'età Della Mixed Reality," *ZoneModa Journal*, Vol. 10, no. 2 (22 December 2020): 75–89, https://doi.org/10.6092/issn.2611-0563/11804.

57. David Benyon, *Spaces of Interaction, Places for Experience* (Cham: Springer International Publishing, 2014), https://doi.org/10.1007/978-3-031-02206-7.

58. O'Neill.
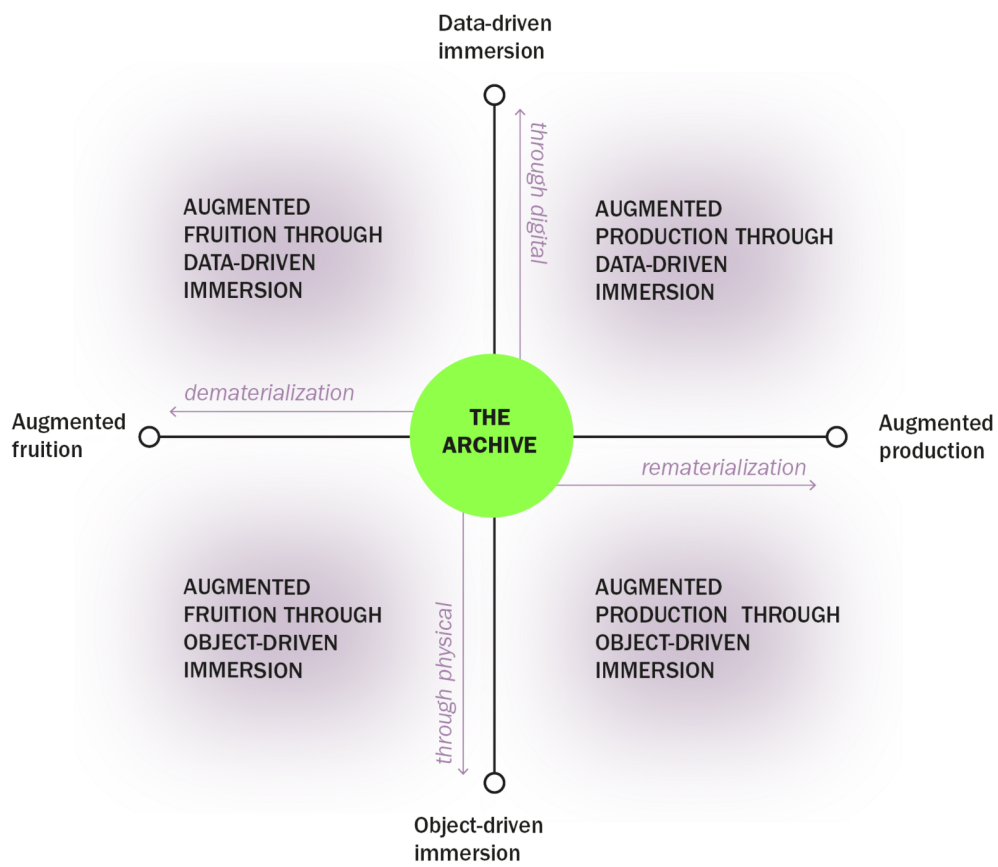
59. "Virtual Fashion Archive."

Figure 1

value by providing augmented insights resulting in fruition and didactic experiences valuable to students and researchers, as well as professionals in the field of fashion design and cultural studies. The *augmented fruition through data-driven immersion* leverages the translation from analogical archival records to data-driven digital collections and aims to foster alternative research approaches arising from algorithmic pattern restitutions and aimed at building new curatorial narratives. The process here starts with data mining processes to analyze the archival information architecture of databases, with the final aim of visualizing unforeseen links and networks of archival metadata, otherwise invisible to plain view. In this context, digital curatorship practices give sense and interpret the resulting heterogeneous networks through distant readings, as in the digital archive IN-COMMONS,[60] which provides an unexpected categorization of the archive by singling out metadata and specific components of digital records. Colours, document typologies, and temporal and geographical cues are used as filters to stimulate curiosity and encourage what is defined as "serendipitous exploration,"[61] meaning interaction with a source of information and learning something beneficial without having any predetermined goals.

On the right side of the matrix, trajectories informing cultural production concerning technological rematerialization are outlined and reflect on machine agencies' capabilities in intervening and expanding cultural knowledge towards new aesthetic and productive languages. The *augmented production through object-centred immersion* focuses on close readings of traditional fashion manufacturing knowledge for dissemination, informing future processes and educating upcoming designers. Digital technologies enable the capture and dissemination of manufacturing-related data, information, and knowledge from both industrial and craftsmanship domains. Motion capture sensors encode unique aspects of gestures, materiality, and haptic dimensions of archival artifacts.[62] Simultaneously, Mixed Reality (MR) technologies transform sensory data into informative, storytelling, and educational experiences for fashion-tech students and professionals. This perspective also empowers SMEs and artisans to educate future technicians and experts, valuing their specialized know-how for high-quality outcomes. Comprised in this scenario, an influential strand of investigation in HCI is related to artisanship 4.0, and the role of collaborative robotics in future augmented co-creation practices. As in the case of Sougwen Chung's artistic production, human and machine interactions are developed using data recorded through a computer vision system tracking the position of the body to feed into a custom robotic collaborator. Recorded electrical signals, body feedback and painterly gestures are directed towards alternative configurations of human and machine collaborations, exploring the mark-made-by-hand and the mark-made-by-machine as an approach to reconfiguring culture-intensive processes. The trajectory of *augmented production and data-driven immersion* revolves around the creative affordances of AI, enabling its almost autonomous generation of novel insights in digital records. AI has made a significant impact on various creative fields, including video game design, video production, architecture, music, writing, and art. Its ability to leverage big data and computational capabilities optimizes and streamlines specific stages of the creative process. In addition to its traditional tasks of automating human cognitive processes like object or pattern recognition, language translation, and recommendations, AI now actively participates in the ideation phase, offering previously unseen insights through a process of rematerialization, where it learns from and builds upon vast cultural datasets.

In the context of fashion design ideation, designers can view AI as a tool to overcome creative blocks and guide both divergent and convergent thinking. By providing synthetic and descriptive keywords, designers can harness AI's capabilities, although current market tools are still in the early stages of development. Nevertheless, they have the potential to profoundly alter our understanding of the cultural significance of human creativity in fashion design processes, ultimately disrupting the role of the fashion designer in our contemporary world.

The proposed trajectories blur the boundaries between cultural and industrial domains, tangible and intangible dimensions, and physical and digital spaces and elements. Fashion archives provide a privileged context to model and experiment with an integrated phygital dimension, enhancing cultural engagement and production. These trajectories can be applied throughout the fashion industry, as it seeks

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60. "IN-COMMON"

61. Elaine G. Toms, "Serendipitous Information Retrieval," *DELOS Workshop* (Zurich: ERCIM, 2000).

62. Casciani and Vandi.

new ways to provide diverse audiences (suppliers, buyers, journalists, customers) with immersive product experiences. Likewise, technology-enhanced fashion archives offer an expanded opportunity to disseminate cultural literacy to a wide range of audiences. They can transform from "situated cultural production" to "immersive and augmented environments," where each component of the tangible collection is accompanied by virtual insights, engaging users in participatory, interactive, and inclusive experiences.[63] Thus, technological implementation redefines existing cultural expressions by reimagining how cultural engagement occurs, facilitating access to cultural heritage, and creating disruptive cultural patterns that involve both human and non-human interactions in cultural production practices.

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63.   Vacca and Vandi.

Bibliography

Benyon, David. *Spaces of Interaction, Places for Experience*. Cham: Springer International Publishing, 2014. https://doi.org/10.1007/978-3-031-02206-7.

Bode, Leticia. "Facebooking it to the Polls: A Study in Online Social Networking and Political Behavior." *Journal of Information Technology & Politics*, Vol. 9, no. 4 (1 October 2012): 352–369. https://doi.org/10.1080/19331681.2012.709045.

Burdick, Anne, Johanna Drucker, Peter Lunenfeld, Todd Presner and Jeffrey Schnapp. *Digital_Humanities*. Cambridge (MA): The MIT Press, 2012.

Calanca, Daniela. "Archivi digitali della moda e patrimonio culturale tra descrizione e integrazione." *ZoneModa Journal*, Vol. 10, no. 2 (22 December 2020): 11–25. https://doi.org/10.6092/issn.2611-0563/11793.

Casciani, Daria and Angelica Vandi. "Hyper-Sensing Creative Acts the Role of Design in Transmitting Intangible Cultural Heritage through Digital Tools." *PAD: Pages on Arts and Design, Digital Memories*, Vol. 15, no. 23 (December 2022): 227–252.

Cassella, Maria. "Il digital curator." *Biblioteche oggi*, Vol. 31, no. 6 (9 July 2015): 3. https://doi.org/10.3302/0392-8586-201306-003-1.

Clark, Judith and Amy de la Haye. *Exhibiting Fashion: Before and After 1971*. New Haven: Yale University Press, 2014.

"CLO3D". Accessed February 27, 2023. https://www.clo3d.com/en/.

Colombi, Chiara and Federica Vacca. "The Present Future in Fashion Design: The Archive as a Tool for Anticipation." *ZoneModa Journal*, Vol. 6 (December 2016): 38–46.

Cross, Nigel. *Designerly Ways of Knowing*. London: Springer, 2006. https://doi.org/10.1007/1-84628-301-9_1.

Dennis, Caen A. "AI-Generated Fashion Designs: Who or What Owns the Goods?." *Fordham Intellectual Property, Media and Entertainment Law Journal*, Vol. XXX, no. 2 (2020): 593–644.

Dimension Studio. "SONZAI. The future of performance." Accessed February 27, 2023, https://www.dimensionstudio.co/work/sonzai-va-dance-future-of-performance.

Di Paola, Modesta and Daniel Lesmes. "Gli interstizi dell'immersivo. Politiche espografiche e pratiche artistiche." In *Atmosfere. Esperienze Immersive Nell'arte e al Museo*. Bologna: Bononia University Press, 2021.

DreamStudio. Accessed Fenruary 27, 2023, https://dreamstudio.com/create/.

Ebsen, Tobias. "Material Screen: Intersection of Media, Art and Architecture." Ph.D. dissertation. Aarus: Aarhus University, 2013.

Esposito, Elena. *Comunicazione artificiale. Come gli algoritmi producono intelligenza sociale*. Milano: Bocconi University Press, 2022.

Giannachi, Gabriella. *Archive Everything: Mapping the Everyday*. Cambridge (MA): The MIT Press, 2016.

Hansen, Lise Amy and Andrew Morrison. "Materializing Movement—Designing for Movement-Based Digital Interaction." *International Journal of Design*, vol. 8, no. 1 (2014): 29–42.

Hayles, N. Katherine. "How We Read: Close, Hyper, Machine." *ADE Bulletin*, no. 150 (2010): 62–79. https://doi.org/10.1632/ade.150.62.

Portale Archivi della Moda del Novecento. Accessed February 27, 2023, https://icar.cultura.gov.it/sistemi-e-portali/portali-tematici/archivi-della-moda-del-novecento.

IN-COMMON. Accessed February 27, 2023, https://in-common.org/.

Jänicke, Stefano, Greta Franzini, Muhammad Faisal Cheema and Gerik Scheuermann. "On Close and Distant Reading in Digital Humanities: A Survey and Future Challenges." *Eurographics Conference on Visualization*. Cagliari: EuroVis, 2015.

Manovich, Lev. "What Is Visualization?", 2010. http://manovich.net/content/04-projects/064-what-is-visualization/61_article_2010.pdf.

Manovich, Lev. *Cultural Analytics*. Cambridge (MA): The MIT Press, 2020.

Manzini, Ezio, François Jégou and Anna Meroni. "Design Oriented Scenarios: Generating New Shared Visions of Sustainable Product Service Systems." In *Design for Sustainability. A Step-by-Step Approach*. Paris and Delft: UNEP, DTIE, Sustainable Consumption and Production Branch, 2009.

Martin, Marcella and Federica Vacca. "Heritage Narratives in the Digital Era: How Digital Technologies Have Improved Approaches and Tools for Fashion Know-How, Traditions, and Memories." *Research Journal of Textile and Apparel*, Vol. 22, no. 4 (1 January 2018): 335–51. https://doi.org/10.1108/RJTA-02-2018-0015.

Merewether, Charles (ed.). *The Archive. Documents of Contemporary Art*. London and Cambridge (MA): Whitechapel and The MIT Press, 2006.

Midjourney. Accessed February 27, 2023, https://www.midjourney.com/home/.

Milgram, Paul, and Fumio Kishino. "A Taxonomy of Mixed Reality Visual Displays." *IEICE Trans. Information Systems* E77-D, no. 12 (1 December 1994): 1321–29.

Moretti, Franco and Oleg Sobchuk. "Hidden in Plain Sight." *New Left Review*, no. 118 (9 August 2019): 86–115.

O'Neill, Alistair. *Exploding Fashion: Making, Unmaking, and Remaking Twentieth Century Fashion*. Tielt: Lannoo, 2021.

Pecorari, Marco. "Fashion Archives, Museums and Collections in the Age of the Digital." *Critical Studies in Fashion & Beauty*, Vol. 10, no. 1 (June 2019): 3–29. https://doi.org/10.1386/csfb.10.1.3_7.

Peirson-Smith, Anne and Ben Peirson-Smith. "Fashion Archive Fervour: The Critical Role of Fashion Archives in Preserving, Curating, and Narrating Fashion." *Archives and Records*, Vol. 41, no. 3 (1 September 2020): 274–98. https://doi.org/10.1080/23257962.2020.1813556.

Rhydderch, Alun. "Scenario Building: The 2x2 Matrix Technique." Paris: Futuribles International, 2017.

Riello, Giorgio. "The Object of Fashion: Methodological Approaches to the History of Fashion." *Journal of Aesthetics & Culture*, Vol. 3, no. 1 (January 2011): 8865, https://doi.org/10.3402/jac.v3i0.8865.

Rocamora, Agnès. "Mediatization and Digital Media in the Field of Fashion." *Fashion Theory*, Vol. 21, no. 5 (3 September 2017): 505–22. https://doi.org/10.1080/1362704X.2016.1173349.

Rossi, Valentina. "Digital Humanities e Moda." *ZoneModa Journal*, Vol. 10, no. 2 (22 December 2020): 43–59. https://doi.org/10.6092/issn.2611-0563/11838.

Schnapp, Jeffrey. "Animating the Archive." *Design & Cultural Heritage*, 2 vol., I: *Archivio animato*. (Milan: Mondadori Electa, 2013), 63–80.

SIUSA: Sistema Archivistico Sistema Informativo Unificato per le Soprintendenze Archivistiche. Accessed February 27, 2023, https://siusa.archivi.beniculturali.it/.

Sougwen Chung. "Mutation of Presence." Accessed February 27, 2023, https://sougwen.com/project/mutationofpresence.

Strand, Eva Andersson, Stefan Lindgren, and Carolina Larsson. "Capturing Our Cultural Intangible Textile Heritage, MoCap and Craft Technology." In *Digital Heritage. Progress in Cultural Heritage: Documentation, Preservation, and Protection*, edited by Marinos Ioannides, Eleanor Fink, Antonia Moropoulou, Monika Hagedorn-Saupe, Antonella Fresa, Gunnar Liestøl, Vlatka Rajcic and Pierre Grussenmeyer, (Cham: Springer International Publishing, 2016) 10–15.

Superficial Studio. "Virtual Fashion Archive." Accessed February 27, 2023, https://virtualfashionarchive.com/.

Toms, Elaine G. "Serendipitous Information Retrieval." *DELOS Workshop*. Zurich: ERCIM, 2000.

Vacca, Federica and Angelica Vandi. "Fashion Archive as Metamedium. Unfolding Design Knowledge through Digital Technologies." Antwerp: Cumulus, 2023.

Vaccari, Alessandra, Paolo Franzo and Giulia Tonucci. "Mise En Abyme. L'esperienza espansa della moda nell'età della *mixed reality*." *ZoneModa Journal*, Vol. 10, no. 2 (22 December 2020): 75–89. https://doi.org/10.6092/issn.2611-0563/11804.

Vandi, Angelica. "Digitalising Fashion Culture: Impacts on Historicised and Contemporary Production and Consumption Practices." In *Storytelling. Esperienze e Comunicazione Del Cultural Heritage*, 309–19. Bologna: Bologna University Press, 2022.

Vänskä Annamari and Hazel Clark. *Fashion Curating: Critical Practice in the Museum and Beyond*. London: Bloomsbury, 2018.

WINT Design Lab. "XYZ | Sensomotoric Interplay of Glass and Body." Accessed February 27, 2023, https://tacitdialogues.com/.

Zhu, Mengjia, Shantonu Biswas, Stejara Iulia Dinulescu, Nikolas Kastor, Elliot Wright Hawkes, and Yon Visell. "Soft, Wearable Robotics and Haptics: Technologies, Trends, and Emerging Applications." *Proceedings of the IEEE* 110, no. 2 (February 2022): 246–72. https://doi.org/10.1109/JPROC.2021.3140049.

Zindato, Danila. "Approaches and Tools for Building the Future within Design Processes." PhD dissertation. Milan: Politecnico di Milano, 2016.

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