

Beyond Erasmus+: From an Educational Grant to a National Digital Fashion Ecosystem

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Abstract. *This paper explores the Erasmus+ 3D4U project as a model for transforming an educational grant into a national digital fashion ecosystem. It argues that international educational grants can serve not only as funding instruments but also as catalysts for long-term innovation by strengthening university–industry collaboration, developing digital skills, and supporting sustainable workforce development.*

Keywords: *international educational grants; innovation ecosystem; digital fashion; university–industry collaboration; digital transformation; Erasmus+.*

The Ukrainian fashion industry is a relatively young yet strategically important sector of the national economy. Beyond the production and commercialization of fashion products, it contributes to the development of creative capital and the expansion of the creative economy, which relies on the generation and dissemination of products through advanced knowledge, innovative technologies, and modern design practices. As such, the fashion industry represents not only an economic sector but also an important technological and human capital resource for sustainable social development. A needs assessment of the small and medium-sized fashion design ecosystem conducted by the British Council Ukraine in 2019 highlighted the urgent need for business incubators, grant programmes, and networking platforms capable of supporting the transformation of local fashion brands into sustainable and internationally competitive enterprises [1].

The global fashion industry is currently undergoing a profound digital transformation that spans the entire product life cycle—from material design and virtual prototyping to circular economy practices. Under these conditions, national competitiveness increasingly depends not only on manufacturing capacity but also on digital competencies, innovation infrastructure, and the ability to integrate into global digital ecosystems. Experts argue that 3D and other digital technologies can become key drivers of the modernization of Ukraine's fashion industry and, more broadly, its economic development. In particular, Schreiber (2020) notes that the absence of a standardized digital materials ecosystem fragments the apparel design process. She argues that the industry should move towards integrated digital networks capable of

linking digital garment design with accurate data on raw materials, environmental impact, and dyeing processes, thereby enabling a more efficient and sustainable production system [4].

Digital transformation has expanded far beyond visual design. Today, it is driven by big data, artificial intelligence, virtual ecosystems, and automation, fundamentally reshaping business models, manufacturing processes, and consumer engagement. Figure 1 illustrates the proposed Digital Fashion Value Chain, demonstrating how digital technologies connect design, production, data management, and sustainable innovation into an integrated fashion ecosystem.

FASHION DIGITAL VALUE CHAIN

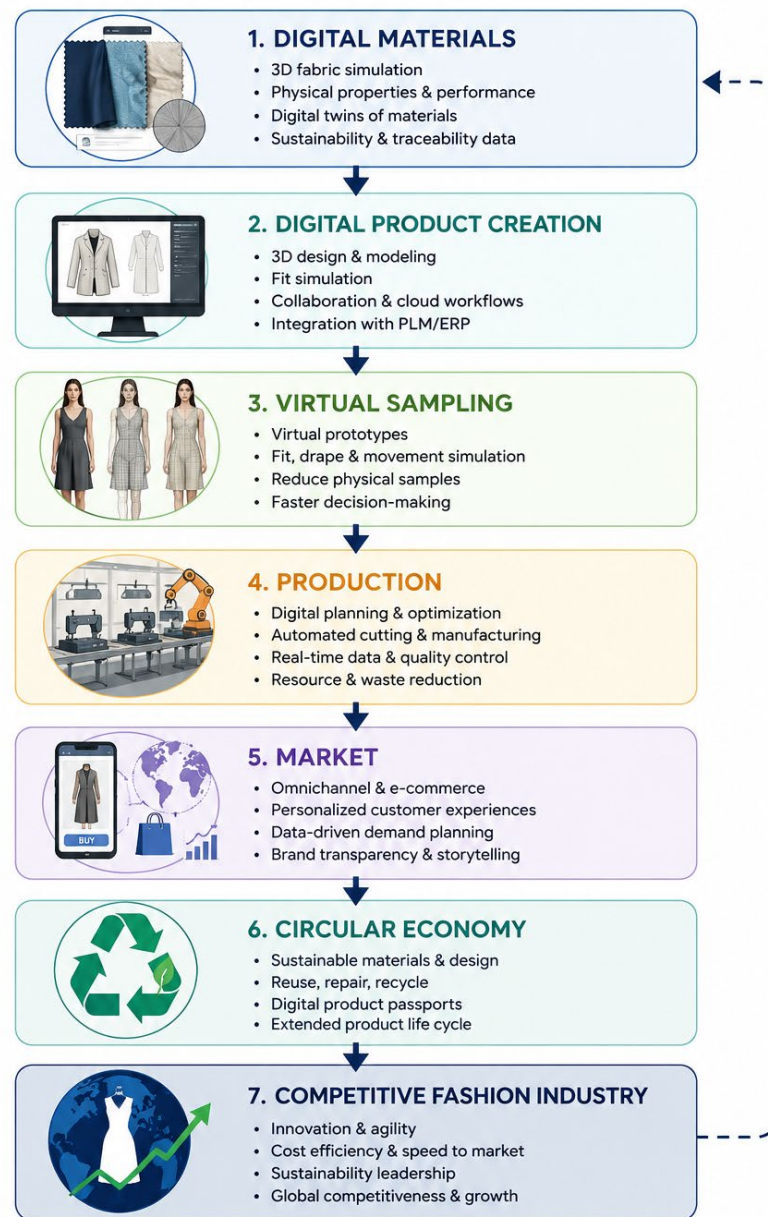
DIGITAL
BY DESIGNSMARTER
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Fig. 1. The Fashion Digital Value Chain Model

The proposed model demonstrates that digitalization is no longer limited to the use of individual 3D design software but instead establishes an integrated digital value chain across the fashion industry. For Ukraine, 3D technologies represent far more than a technological trend; they constitute a strategic instrument for industrial development by improving resource efficiency, enabling global collaboration, educating a new generation of designers, fostering innovative fashion brands, and enhancing the international competitiveness of Ukrainian fashion.

Despite this potential, the adoption of 3D technologies within Ukraine's fashion industry remains at an early stage of development. The sector continues to face several structural challenges, including conservative manufacturing practices, a shortage of qualified specialists, and insufficient collaboration between higher education institutions and industry. As a result, the fashion sector is entering a new era in which digital technologies are transforming not only manufacturing processes but also educational models and workforce development [5].

In response to these challenges, the Erasmus+ project **"3D Concepts for Fashion Education in Ukraine (3D4U)"** was launched in 2023. The project addresses the shortage of specialists in 3D technologies for fashion education through the establishment of three 3D Fashion Hubs at three Ukrainian higher education institutions:

- Kyiv National University of Technologies and Design;
- Lutsk National Technical University;
- Khmelnytskyi National University.

The conceptual vision of the 3D4U project, initiated by **Dr. Evridiki Papachristou** of the International Hellenic University, extended well beyond the establishment of three educational laboratories. From its inception, the project was designed to promote knowledge transfer, strengthen university–industry collaboration, and establish the foundations of a sustainable digital fashion ecosystem in Ukraine [2].

Unlike conventional educational initiatives, which primarily focus on upgrading physical infrastructure, 3D4U was conceived as a mechanism for the systemic transformation of interactions between higher education, research, and industry. The 3D4U Hubs were intentionally established as bridges between academia and the fashion sector, becoming the first large-scale and systematic initiative of this kind in Ukraine. Equipped with advanced digital technologies—including CLO 3D, Browzwear, iCad, 3D scanners, 3D printers, and virtual prototyping systems—the laboratories enable:

- students to acquire industry-relevant practical skills;
- companies to access innovative solutions and a new generation of qualified professionals;
- academic staff to strengthen their digital competencies through professional development.

Consequently, the 3D4U Hubs represent more than educational laboratories. They function as innovation platforms that integrate education, research, and industry, enabling knowledge transfer, human capital development, and the emergence of a sustainable digital fashion ecosystem.

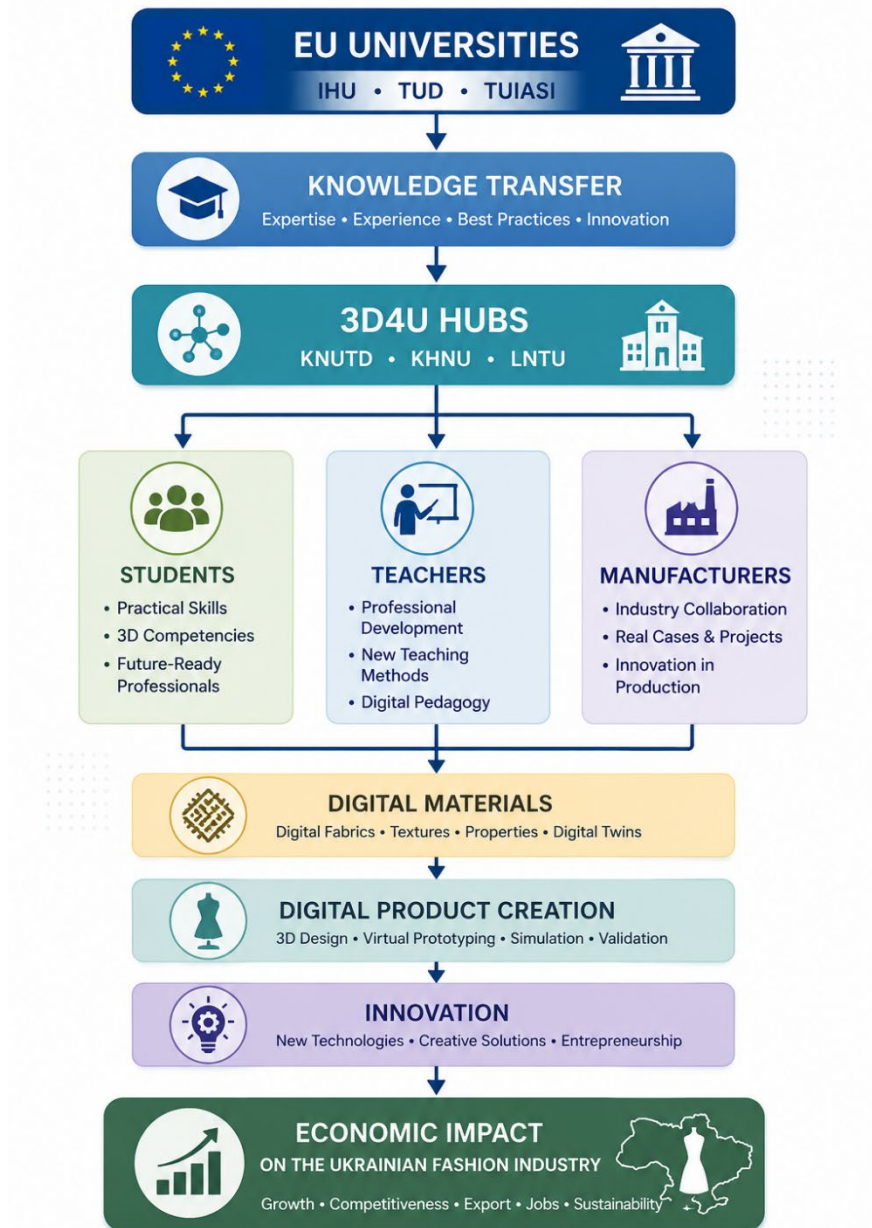


Fig. 2. The 3D4U Digital Fashion Ecosystem Model (3D4U-DFEM)

The success of the 3D4U project is largely attributed to the participation of leading European higher education institutions with extensive experience in 3D fashion education and research, including the **International Hellenic University (IHU)**, **Technische Universität Dresden (TUD)**, and **Gheorghe Asachi Technical University of Iași (TUIASI)**. These institutions have played a pivotal role in transferring knowledge, methodologies, and best practices developed through previous international initiatives.

The outcomes of this collaboration are presented by **Papachristou et al. (2025)**, who demonstrate how partnerships between universities, research institutions, and industry provide a valuable framework for establishing sustainable digital fashion infrastructure and strengthening innovation capacity in higher education [3].

Consequently, the involvement of European partner institutions became one of the key factors underpinning the successful implementation of the initiative. Unlike many technology-oriented educational projects that primarily focus on acquiring equipment, 3D4U was conceived as a long-term ecosystem-building initiative. Its strategic objective was to establish sustainable cooperation between European universities, Ukrainian higher education institutions, and the fashion industry through knowledge transfer, digital competence development, and innovation.

As Ukraine's digital fashion sector is still emerging, 3D4U was designed not to adapt to an existing ecosystem but to contribute to its creation. This distinguishes the project from many educational initiatives that conclude with the completion of grant funding. Instead, 3D4U adopts an ecosystem-oriented approach in which the grant serves as a catalyst for long-term structural transformation.

Within this framework, 3D4U is positioned not simply as an educational project but as a conceptual model for developing a national digital fashion ecosystem. The proposed model follows a sequential pathway from identifying a global challenge, through developing an institutional solution and achieving measurable outcomes, to establishing a sustainable innovation ecosystem. It creates a multi-level value network in which education, industry, and international cooperation reinforce one another. Such an integrated approach enables educational investments to generate long-term educational, economic, and societal value while supporting continuous knowledge exchange among stakeholders. Figure 3 synthesizes this concept into a scalable value creation model, illustrating how educational investment can generate measurable economic and social outcomes and serve as the foundation for long-term ecosystem development.

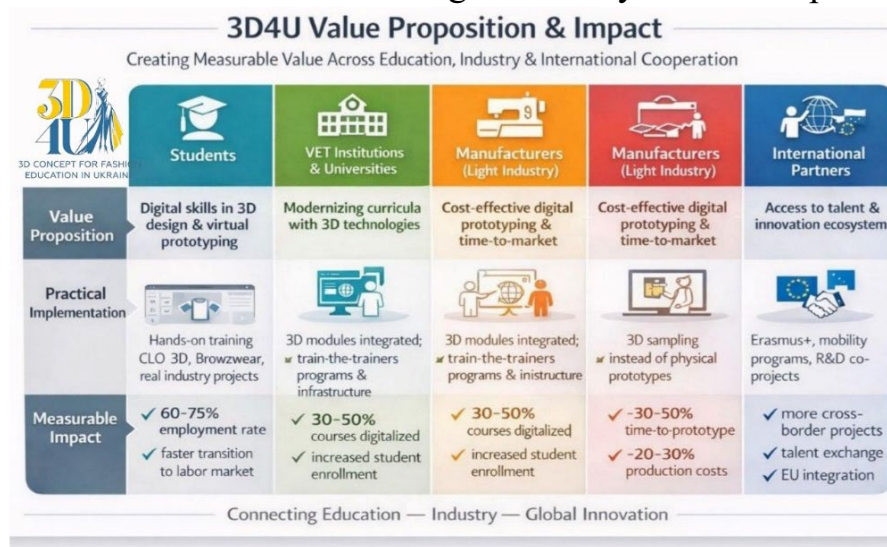


Fig. 3. The 3D4U Grant-to-Ecosystem Framework (GEF)

The 3D4U project proposes a conceptual model illustrating how a country can evolve from establishing individual 3D hubs to building a national digital fashion ecosystem. Within this framework, an international educational grant functions not merely as a source of financial support but as a catalyst for systemic transformation.

Educational grants are commonly assessed by tangible outputs, such as the acquisition of equipment, the development of new courses, or the number of trained specialists. This study argues that their true value lies in their capacity to generate sustainable institutional change that continues beyond the funding period. In this sense, the long-term impact of 3D4U extends beyond educational infrastructure, demonstrating how strategic investment in higher education can stimulate knowledge transfer, strengthen university–industry collaboration, and contribute to the emergence of a national innovation ecosystem. By 2030, the 3D4U network is envisioned as Ukraine's leading digital fashion ecosystem, bringing together universities, manufacturers, start-ups, researchers, and international partners within a shared innovation platform. The proposed Grant-to-Ecosystem Framework (GEF) constitutes the principal conceptual contribution of this study (Figure 4)



Fig. 4. Pathway from Educational Grant to Sustainable Innovation Ecosystem

Despite the ongoing war, Ukraine continues not only to defend its sovereignty but also to transform its higher education system through innovation and international cooperation. The 3D4U initiative demonstrates a new model of educational development that integrates engineering, design, digital technologies, and industry into a unified innovation ecosystem. Rather than focusing solely on the creation of modern educational infrastructure, the project illustrates how an international educational grant can become a catalyst for systemic transformation by strengthening university–industry cooperation, fostering digital competencies, and creating the conditions for sustainable workforce development.

The experience of 3D4U suggests that international educational grants should be viewed not merely as funding instruments for individual projects, but as strategic mechanisms capable of initiating long-term national innovation ecosystems. In this context, the project's most significant outcome is not the establishment of three 3D hubs, but the demonstration of a scalable model through which educational investment generates lasting educational, industrial, and societal impact. Such an approach contributes to preparing a new generation of highly qualified professionals capable of supporting Ukraine's technological modernization and post-war economic recovery.

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