CRAEFT

care, judgment, dexterity

Exploitation Plan and Activities

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Executive summary

This deliverable presents the final exploitation framework and outcomes of Craeft, consolidating the work carried out throughout the project lifecycle and positioning its results for sustained use and impact beyond project completion (M36). Craeft has developed a diverse portfolio of exploitable results addressing the documentation, understanding, transmission, and innovation of craft knowledge as part of Europe's tangible and intangible cultural heritage.

The exploitation strategy of Craeft was implemented as a continuous and iterative process, grounded in a set of shared principles: identifying diverse exploitable results; anticipating and mitigating exploitation barriers; ensuring relevance through stakeholder engagement; clarifying roles and responsibilities; and enabling uptake by partners as well as third parties. These principles have guided the design, development, and consolidation of Craeft outcomes across all Work Packages.

This was not always straightforward. The heterogeneity of the consortium, spanning academic laboratories, SMEs, glass schools, and museum networks, made it necessary to revisit the scope of several exploitable results midway through the project, as partners' available resources, strategic interests, and technical readiness evolved. What emerged is less a pre-planned product portfolio than a living negotiation between ambition and practicality.

Throughout the project, potentially exploitable results were systematically identified for each Work Package, with particular emphasis on WP3 (Digital Re-enactment), WP4 (Education and Training), and WP5 (Design). For each exploitable outcome, partners documented its innovation potential, application domains, and pathways for uptake, encompassing technological, research, educational, service-oriented, and commercial perspectives. Intellectual Property considerations were addressed in line with the Grant Agreement, reflecting the actual contributions of partners and enabling both joint and individual exploitation routes.

By project completion, Craeft has delivered a coherent ecosystem of interoperable tools, platforms, and methods, including craft-specific simulators, advanced digitisation techniques, immersive training and design environments, haptic interfaces, educational games, and a community portal. These results are designed for reuse and extension, supporting a wide range of post-project exploitation scenarios such as further research and innovation, institutional adoption by cultural heritage and training organisations, integration into educational curricula, service provision by SMEs, and uptake by creative and craft communities.

The Craeft Exploitable Ecosystem: By project completion, Craeft has delivered a high-readiness ecosystem of interoperable assets:

- **Scientific & Methodological:** A validated Ethnographic Protocol for capturing tacit craft knowledge and a Craft Ontology (CrO) aligned with international standards.
- **Technological:** High-fidelity 2½D surface scanners (exceeding 1 gigapixel/cm²), haptic interfaces for motor-skill training, and GAN-based simulators for material deformation.
- **Educational:** Immersive Craft and Apprentice Studios that enable remote, hybrid, and self-guided learning to bridge the generational skills gap.

- **Collaborative:** The Community Portal, functioning as a digital entrepreneurship hub for European craft micro-businesses.

Strategic Impact & Sustainability: Craeft adopts a flexible, multi-path exploitation approach that accommodates the diverse needs of researchers, SMEs, and cultural heritage institutions. Rather than a single business model, the project provides a portfolio of actionable assets. These results are positioned to generate long-term resilience for the European craft sector, ensuring that fragile heritage knowledge is not only preserved but actively revitalised through digital innovation and sustainable economic models.

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Abbreviations

AR	Augmented Reality
CAP	Craeft Authoring Platform
CH	Cultural Heritage
CHI	Cultural Heritage Institutions
CrO	Crafts Ontology
ICH	Intangible Cultural Heritage
IPR	Intellectual Property Rights
WCC	World Crafts Council

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1 Introduction

Craeft is a collaborative research and innovation project funded by the European Union, focusing on the documentation, understanding, transmission, and innovation of tangible and intangible cultural heritage, with a particular emphasis on crafts. By combining advanced digital technologies with craft practice, education, and heritage expertise, Craeft has developed a rich ecosystem of methods, tools, platforms, and knowledge resources that are exploitable beyond the project's lifetime.

Exploitable results in Craeft take multiple forms and extend well beyond the creation of stand-alone commercial products. They include technological components, methodological frameworks, digital platforms, educational tools, semantic models, datasets, and collaborative networks.

In practice, exploitation takes very different forms depending on who is using the results and why. A VR training company like Khora sees an opportunity to extend its product offering into cultural heritage verticals. A craft school like CERFAV is more interested in rethinking how it integrates digital tools into traditional apprenticeship. A research institution like ARMINES wants to anchor its next grant application in proven methodology. These are not three versions of the same thing; they are genuinely different motivations, and the exploitation strategy had to accommodate all of them.

Craeft has adopted a broad understanding of exploitation, recognising that impact may materialise through commercial, institutional, educational, and societal channels. Academic, industrial, SME, and cultural heritage partners have been actively involved in shaping exploitation opportunities in line with their respective missions, capacities, and long-term strategies.

A central aspect of the Craeft approach is the careful management of Intellectual Property Rights (IPR). IPR considerations have been embedded throughout the project to ensure that cooperative developments can be sustainably exploited, while preserving openness, interoperability, and fair access where appropriate. This enables partners to pursue individual or joint exploitation paths while safeguarding shared results.

Craeft builds on the consortium's strong expertise in digital technologies for cultural heritage, including 3D digitisation, semantic representation, artificial intelligence, immersive environments, and interactive systems. These technologies have been applied to the capture, representation, and transmission of craft knowledge and techniques that are often fragile, tacit, and at risk of disappearance. By translating craft practices into structured digital representations and experiential tools, Craeft contributes to both preservation and innovation.

The results demonstrate clear benefits for systematic research, documentation, education, and training in crafts, while also creating opportunities for reuse and extension in other domains. Beyond the direct benefits for partners, Craeft generates positive externalities for local communities, creative sectors, and European cultural heritage as a whole. This exploitation deliverable documents how these results are positioned for sustained use and impact after the end of the project.

2 Craeft exploitation strategy

The exploitation strategy of Craeft was conceived and implemented as a continuous, structured process accompanying the project from its early stages through to completion. By M36, this strategy has matured into a consolidated framework that supports the post-project uptake, sustainability, and transferability of Craeft results.

The strategy reflects the hybrid nature of Craeft outcomes, which include knowledge, methods, digital platforms, software components, training tools, and collaborative networks. Rather than relying on a single exploitation model, Craeft adopted a multi-path exploitation approach, tailored to the diversity of results and the varied profiles of partners and stakeholders.

2.1. Guiding Principles of the Craeft Exploitation Strategy

The Craeft exploitation strategy was guided by the following core principles, which have been applied throughout the project and consolidated at its conclusion:

- Identification of diverse exploitable results. Craeft systematically identified multiple types of exploitable outcomes, including scientific knowledge, methodological frameworks, ontologies, software platforms, educational tools, and stakeholder networks. Both direct and indirect value were considered, acknowledging that impact may emerge through research continuation, institutional adoption, education, or commercial services.
- Stakeholder-oriented value assessment. Exploitable results were assessed in relation to the needs and capacities of different stakeholder groups, including researchers, SMEs, cultural heritage institutions, craft training organisations, educators, designers, and creative practitioners.
- Early identification and mitigation of exploitation barriers. Potential barriers to exploitation were identified early and addressed through design choices, modular architectures, open standards, and active stakeholder involvement.
- User engagement and validation. Craeft results were developed and refined through continuous engagement with end users and stakeholders, ensuring that outputs respond to real needs and are usable in practical contexts. This engagement strengthened both the relevance and uptake potential of the results.
- Clear allocation of roles and responsibilities. The exploitation strategy clarified the roles of individual partners in relation to specific outcomes, including technical ownership, maintenance responsibilities, and post-project exploitation actions.
- Support for downstream and third-party exploitation. Beyond consortium-level exploitation, the strategy explicitly supports uptake by intermediate and end users, such as education centres, creative industries, tourism actors, cultural institutions, and independent practitioners.

One concrete example of these principles in action: early in the project, the Ethnographic Protocol was scoped as a purely methodological tool with no commercial pathway. By M18, it had become clear that training organisations, particularly those facing the challenge of documenting knowledge held exclusively by ageing master craftspeople, were willing to pay for structured protocol support as a service. This realisation shifted the WP1 exploitation route from purely academic dissemination toward service-oriented uptake, without requiring any change to the underlying methodology."

2.2. Implementation of the Exploitation Strategy

Exploitation in Craeft was not treated as a single deliverable-driven activity, but as an iterative process embedded in the project lifecycle. Key implementation actions included:

- Mapping exploitation potential per partner. Each partner assessed how Craeft results align with their institutional mission, expertise, and long-term strategy, leading to differentiated exploitation pathways across research, commercial, educational, and institutional domains.
- Integration of Intellectual Property considerations. Intellectual Property Rights (IPR) were systematically reviewed across Craeft outputs, in accordance with the Grant Agreement. Ownership, access rights, and exploitation responsibilities were clarified and consolidated in the final phase to support post-project use and collaboration.
- Design for sustainability and reusability. Craeft results were developed with sustainability in mind, favouring open standards, modular architectures, and interoperability. This design approach reduces dependency on project-specific funding and facilitates reuse, adaptation, and extension by partners and third parties.
- Preparation for post-project continuation. Exploitation activities were progressively oriented toward post-project continuation, identifying which components could be maintained, further developed, or integrated into existing infrastructures and services in a financially and organisationally sustainable manner.

2.3. Post-Project Exploitation Outlook

At project closure, Craeft delivers a portfolio of exploitable assets rather than a single product or service. These assets are ready to be:

- Integrated into ongoing research and innovation activities
- Adopted by cultural heritage and training institutions
- Used as a foundation for education and skills development
- Incorporated into commercial or service-oriented offerings by SMEs
- Taken up and adapted by third parties beyond the consortium

The Craeft exploitation strategy thus ensures that project results remain actionable, adaptable, and impactful beyond the funding period, contributing to the long-term preservation, transmission, and innovation of craft knowledge in Europe and beyond.

3 Innovative results per WP

3.1 WP1. Understanding and Digitalisation

3.1.1 Description of the Final Exploitable Outcome

WP1 resulted in the definition, validation, and application of a structured ethnographic protocol for craft understanding, specifically designed to support the interdisciplinary needs of Craeft. The protocol enables the systematic documentation, comparison, and interpretation of craft practices by combining methods from the social sciences with the formal requirements of Artificial Intelligence–driven modelling.

At project end, the protocol has been fully implemented and validated across multiple craft instances and has directly supported downstream technological developments in craft representation, simulation, education, and design. It structures data collection around three complementary and interrelated components:

1. Functional and structural documentation of technical actions, defined jointly with craftspeople and recorded through observation of operational sequences.
2. Individual and professional contextualisation, collected through life-course interviews with crafts practitioners.
3. Verbal and emotional articulation, captured through video elicitation sessions in which craftspeople reflect on and explain their recorded gestures and actions.

This protocol ensured that all datasets produced within Craeft rest on a shared, reproducible experimental basis, while explicitly integrating the practitioners' own perspectives into the interpretation of craft gestures and material interactions.

3.1.2 Exploitation Route Selected

The ethnographic protocol is exploited primarily through:

*   Institutional and research adoption (academic research, cultural heritage institutions)
*   Methodological reuse in future projects (EU and national R&D)
*   Educational and training contexts (craft schools, museums, design education)

The consortium deliberately opted for a non-commercial exploitation route, prioritising openness, replicability, and long-term methodological impact.

3.1.3 Post-Project Exploitation Measures Taken

Following the end of the project, the protocol is being exploited through:

*   Continued use by partners in follow-up research activities related to crafts, material culture, and embodied knowledge.

- Integration into methodological toolkits for interdisciplinary research combining ethnography and AI-based modelling.
- Application in education and heritage contexts, notably in vocational training, fine arts and design schools, and museum documentation practices.
- Reuse as a reference framework for structuring datasets intended for gesture recognition, action modelling, and semantic representation.

The protocol has also proven transferable beyond the specific crafts addressed in Craeft, reinforcing its suitability for broader application across manual professions and heritage-related domains.

3.1.4 Actors Responsible and IPR Status

- **IPR holder:** Craeft Consortium (joint ownership)
- **Lead exploiters:** Partners of the consortium
- **Access model:** Open methodological framework, reusable with attribution

No exclusive licensing or commercial restrictions apply.

3.1.5 Sustainability Outlook

The sustainability of this outcome is ensured through:

- Its methodological independence from specific technologies
- Its compatibility with diverse research and documentation contexts
- Its adoption as a shared reference protocol in interdisciplinary craft research

The protocol is expected to have a long-term impact through continued academic use and integration into future research infrastructures.

3.2 WP2. Craft Representation

WP2 delivered three closely interrelated exploitable outcomes that together constitute a craft representation framework, linking action modelling, semantic reasoning, and authoring tools.

3.2.1 Archetypal Action Simulators

Description of the Final Exploitable Outcome

Archetypal Action Simulators constitute a generic, reusable computational framework for modelling elementary craft actions and their effects on materials. At project end, these simulators provide formalised representations of actions such as knotting, additive and subtractive processes, and free-form transformations, enriched with parameters, affordances, and execution conditions.

The simulators are grounded in multimodal datasets combining:

- Semantic descriptions of actions and plans
- Geometric and mechanical representations
- Motion capture, haptic interaction, and material transformation data

When executed, the simulators predict the outcome of an action under specified parameters and environmental conditions, forming the conceptual and technical basis for craft-specific simulations developed in later WPs.

Exploitation Route Selected

- Research continuation and integration into simulation frameworks
- Educational and training use (via downstream tools such as Craft Studio)
- Foundational technology for future craft-tech developments

Post-Project Exploitation Measures Taken

- Continued use by technical partners as a core modelling layer in follow-up R&D.
- Integration into educational demonstrators and simulation-based training tools.
- Use as a reference abstraction for generalising craft actions across materials and domains.

Actors Responsible and IPR Status

- IPR holders: KHORA, FORTH, ARMINES, CETEM, CNAM, PIOP, CERFAV
- IPR regime: Joint ownership under Craeft GA
- Exploitation mode: Joint research exploitation and non-exclusive reuse

Sustainability Outlook

The simulators' sustainability lies in their abstraction level: by modelling archetypal actions rather than craft-specific instances, they remain reusable, extensible, and adaptable to new materials and domains.

3.2.2 Maker–Material–Negotiation Model

Description of the Final Exploitable Outcome

This outcome consists of an extended ontology for modelling maker–material interactions, built upon the CIDOC CRM–based Craft Ontology (CrO). The model formally represents tools, materials, workspaces, action plans, hypotheses, and contextual narratives that characterise real crafting processes.

Encoded in RDF Schema and OWL 2 DL, the model supports computational inference, enabling reasoning over actions, conditions, and material effects. At project end, it functions as the semantic backbone linking ethnographic knowledge, action simulators, and authoring tools.

Exploitation Route Selected

- Semantic infrastructure for research and documentation

- Integration into authoring and simulation platforms
- Alignment with international CH standards (CIDOC-CRM, EDM)

Post-Project Exploitation Measures Taken

- Continued maintenance and reuse by ontology partners.
- Integration into the Craeft Authoring Platform.
- Adoption as a semantic reference for future projects addressing embodied knowledge and material practices.

Actors Responsible and IPR Status

- IPR holders: CNR, FORTH, CETEM, CNAM, PIOP, CERFAV
- IPR regime: Joint ownership
- Access model: Open semantic framework, standards-compliant

Sustainability Outlook

The model's standards alignment, modular design, and ability to evolve alongside new use cases without loss of semantic coherence are considered strong points.

3.2.3 Craeft Authoring Platform (CAP)

Description of the Final Exploitable Outcome

The Craeft Authoring Platform (CAP) is the integrative exploitation vehicle of WP2, operational at project end as a semantic authoring and knowledge management environment. CAP extends the Craeft Online Platform (MOP) by enabling the instantiation of entities from the extended Craft Ontology and linking them to digital assets such as recorded actions and reconstructed objects.

CAP is fully compatible with CIDOC-CRM and Europeana Data Model, ensuring interoperability and visibility within established cultural heritage infrastructures.

Exploitation Route Selected

- Institutional adoption by CH organisations and research infrastructures
- Educational and training use
- Semantic publication and dissemination via Europeana

Post-Project Exploitation Measures Taken

- Deployment as the main authoring backend for Craeft-generated content.
- Use by partners for structuring and publishing craft knowledge.
- Alignment with Europeana workflows for long-term accessibility.

- Legacy Caretaker: CNR-ISTI to host the semantic backbone and authoring backend for a minimum of 36 months post-project to ensure interoperability with Europeana workflows.
- Exploitation mode: Joint, non-exclusive, standards-based

Sustainability Outlook

Positive qualities:

- Standards compliance
- Institutional anchoring in CH and research contexts
- Its role as a long-term semantic access point to Craeft results

3.3 WP3. Digital Re-enactment

WP3 focused on the digital re-enactment of craft practices, building on the ethnographic foundations of WP1 and the representation frameworks of WP2. At project end, WP3 delivered a set of software methods, simulation components, and digitisation technologies that enable the dynamic visualisation, replay, and analysis of craft actions, material transformations, and professional scenes.

3.3.1 Craft-Specific Action Simulators

Description of the Final Exploitable Outcome

WP3 delivered a software method for refining archetypal action simulators into craft-specific simulators, enabling the digital re-enactment of concrete craft practices. The method is based on generative AI techniques, notably Generative Adversarial Networks (GANs), trained on multimodal craft representations collected during the ethnographic and recording activities.

At project end, the method supports:

- The adaptation of generic action models to specific crafts and materials
- The incorporation of third-party and synthetic datasets to enrich training
- Fine-tuning with craft-specific data to ensure accuracy and realism

The simulators integrate scene understanding outputs (motion, tools, materials, environment) and generate realistic 3D previews of crafting processes, including material effects, transformations, and environmental conditions. These previews function as mental imagery tools, allowing practitioners, students, and researchers to visualise the consequences of actions before or alongside physical execution.

Exploitation Route Selected

- **Research and** technology reuse in simulation and craft-tech R&D
- Educational and training demonstrators (linked to later WP tools)
- Foundational component for immersive applications (VR/AR prototypes)

Post-Project Exploitation Measures Taken

- Continued use of the method by technical partners as a refinement layer on top of archetypal simulators.
- Integration into craft-specific demonstrators developed within Craeft.
- Reuse as a generic approach for adapting AI-based simulations to domain-specific practices beyond crafts.

Actors Responsible and IPR Status

- IPR holders: FORTH, CETEM, CNAM, PIOP, CERFAV
- IPR regime: Joint ownership under the Craeft GA
- Exploitation mode: Non-exclusive research and educational use

Sustainability Outlook

The sustainability of this outcome is ensured by:

- Its methodological independence from specific crafts
- Its compatibility with evolving generative AI frameworks
- Its integration potential with future immersive and training platforms

3.3.2 Digitisation of Material Treatment and Deformation

Description of the Final Exploitable Outcome

This outcome consists of an adaptive simulation framework for modelling material treatment and deformation, combining computer vision, machine learning, graphics, and 3D sensing. The framework captures how practitioner actions affect materials by explicitly modelling the context of actions (e.g. subtractive, additive, interlocking).

At project end, the framework enables:

- Reduction of computational complexity by context-aware learning
- Parameter estimation through 3D sensing
- Simulation and explanation of material transformations using machine learning models
- Training based on large datasets combining real and synthetic photorealistic data

The result is a reusable simulation component capable of visualising and replaying material deformations, supporting both analytical understanding and pedagogical use.

Exploitation Route Selected

- Research exploitation in material modelling and simulation
- Integration into craft-specific simulation pipelines
- Educational use for explaining material behaviour

Post-Project Exploitation Measures Taken

- Continued use as a core modelling component in WP3-derived simulations.
- Reuse of datasets and trained models in follow-up research.
- Conceptual transfer to other domains involving complex material behaviour.

Actors Responsible and IPR Status

- IPR holders: FORTH, CNAM, CERFAV
- IPR regime: Joint ownership
- Exploitation mode: Research-oriented, non-exclusive

Sustainability Outlook

Enabling factors:

- The framework's generality across materials
- Its reliance on standard ML and vision techniques
- Its reusability beyond the craft domain

3.3.3 High-Resolution 2D and 2½D Surface Scanning

Description of the Final Exploitable Outcome

WP3 produced a high-resolution surface digitisation system for heritage objects, capable of capturing 2D and 2½D (anaglyph) surface data at resolutions exceeding 1 gigapixel per square centimetre. The system combines advanced surface scanning and photogrammetry to capture both visual detail and surface structure.

A distinctive feature of this outcome is its ability to document surface characteristics related to tactile perception, such as smoothness and coarseness, extending beyond purely visual digitisation.

Exploitation Route Selected

- Cultural heritage documentation and preservation
- Research and education
- High-fidelity digital archives

Post-Project Exploitation Measures Taken

- Use in heritage-oriented digitisation workflows.
- Integration of produced assets into Craeft repositories and platforms.
- Reuse of the methodology in follow-up digitisation initiatives.

Actors Responsible and IPR Status

- IPR holders: FORTH, CETEM, CNAM, PIOP
- IPR regime: Joint ownership

Sustainability Outlook

The scanning system has already demonstrated its value beyond the project: FORTH's collaboration with textile artist Linardaki-Parisot to digitise woven works is a practical example of how a tool developed for marble and glass can migrate, almost without modification, into entirely different material domains. That adaptability is the real sustainability story here.

3.3.4 Digitisation of Transparent, Translucent, and Shiny Materials

Description of the Final Exploitable Outcome

This outcome delivers a non-contact 3D digitisation method for transparent, translucent, and reflective materials, based on polarised and structured illumination. The method addresses long-standing challenges in digitising materials such as glass, amber, stained glass, and metals.

At project end, the method integrates Augmented Reality guidance to support operators during acquisition and builds directly on the outcomes of the Transparent3D project, extending its capabilities and applicability.

Exploitation Route Selected

- Heritage preservation and conservation
- Research and industrial material digitisation
- Advanced documentation workflows

Target Stakeholders: National Museums and Conservation Labs. Access Model: Service-based scanning provision by FORTH and partners, leveraging the 1 gigapixel resolution capability.

Post-Project Exploitation Measures Taken

- Continued refinement of the method by technical partners.
- Application to heritage and design use cases involving complex optical materials.
- Reuse of AR-assisted acquisition workflows in related digitisation projects.

Actors Responsible and IPR Status

- IPR holders: FORTH, ARMINES
- IPR regime: Joint ownership

Sustainability Outlook

The method's sustainability is ensured by:

- Its uniqueness in addressing transparent materials
- Direct continuity with previous EU-funded research
- Applicability beyond heritage contexts

3.3.5 Scene and Activity Monitoring

Description of the Final Exploitable Outcome

WP3 delivered a **multimodal** scene and activity monitoring framework for professional craft environments. The framework captures and analyses craft scenes as complex systems involving practitioners, gestures, tools, materials, spatial movement, and sound.

At project end, extensive multimodal datasets were produced across four craft domains (marble carving, glassblowing, silversmithing, porcelain), following the Craeft ethnographic protocol. These datasets support:

- Hierarchical modelling of professional gestures
- AI-based analysis of movements and interactions
- Comparative understanding of craft techniques

Video elicitation played a central role, enabling craftspeople to reflect on and explain their actions, thereby enriching both the datasets and their interpretability.

Exploitation Route Selected

- Documentation and preservation of craft knowledge
- Vocational training and skills transmission
- Foundational datasets for AI research

Post-Project Exploitation Measures Taken

- Reuse of datasets and methodologies in follow-up research.
- Dissemination of the approach to other craft and manual-profession initiatives.
- Conceptual contribution toward a new standard for documenting embodied expertise.

Actors Responsible and IPR Status

- IPR holders: ARMINES, FORTH
- IPR regime: Joint ownership

Sustainability Outlook

Sustainability factors:

- Strong methodological grounding
- Transferability to other professions
- Long-term value of curated multimodal datasets

3.4 WP4. Education and Training

WP4 translated Craeft's research and technological results into educational, training, and experiential tools, enabling the transmission of craft knowledge, skills, and embodied expertise. At project end, WP4 delivered a coherent ecosystem of authoring, learning, haptic, and playful tools that support craft education across formal training, informal learning, and public engagement contexts.

3.4.1 Craft Studio

Description of the Final Exploitable Outcome

The Craft Studio is a fully developed authoring and simulation environment that enables the creation, visualisation, and execution of craft simulations using immersive 3D rendering. Built on a game-engine-based rendering pipeline, it integrates tightly with the Craft Authoring Platform (CAP), allowing simulations to be directly linked to semantic representations such as action plans, schemas, tools, and materials.

At project end, the Craft Studio supports:

- Generic and craft-specific simulations, drawing on WP2 and WP3 outcomes
- Dynamic instantiation of simulation components, based on user-selected tools, materials, and devices
- Multi-device visualisation, including screens, MR/VR headsets, and haptic interfaces
- Data-driven simulation outputs, including material and energy usage metrics

The Craft Studio functions as a bridge between formal craft knowledge and experiential simulation, enabling users to explore crafting scenarios, rehearse procedures, and analyse resource implications in a controlled digital environment.

Exploitation Route Selected

- Educational and vocational training environments
- Research demonstrators and pilot learning tools
- Foundation for immersive craft-learning applications

Post-Project Exploitation Measures Taken

- Use of the Craft Studio as a reference authoring environment for Craeft demonstrations.

- Reuse of the software architecture and workflows in follow-up research and training initiatives.
- Continued exploitation by technical partners as a generic simulation authoring framework adaptable to other domains.

Actors Responsible and IPR Status

- IPR holders: ETH, CETEM, PIOP, CERFAV
- IPR regime: Joint ownership under the Craeft GA
- Exploitation mode: Research, education, and demonstration use

Sustainability Outlook

Qualities:

- Modular architecture compatible with evolving game engines
- Reusability across crafts and training contexts
- Integration with the semantic and simulation pipelines developed in Craeft

3.4.2 Apprentice Studio

Description of the Final Exploitable Outcome

The Apprentice Studio is an educational and training environment derived from the Craft Studio, specifically designed to support personalised learning, skill assessment, and guided practice. It introduces structured learning pathways, adaptive feedback, and problem-based learning scenarios.

At project end, the Apprentice Studio provides:

- Tailored courses and exercises, with explicit success indicators
- Multiple learning interfaces, including desktop, web-based educational content, and immersive 3D environments
- Performance tracking, including logs, success rates, and simulated material and energy usage
- Open-ended problem scenarios, addressing health, safety, fatigue, and experimental archaeology

A distinctive feature is the inclusion of experimental archaeology scenarios, where learners attempt to recover or reinterpret lost techniques using historical knowledge linked through CAP. This anchors training in both technical and cultural dimensions of craft practice.

Exploitation Route Selected

- Vocational and higher education
- Craft apprenticeship and lifelong learning
- Experimental archaeology and heritage education

Post-Project Exploitation Measures Taken

- Use as a training demonstrator within Craeft dissemination activities.
- Reuse of learning concepts and interfaces in follow-up educational research.
- Transfer of the adaptive learning logic to other skill-based training contexts.

Actors Responsible and IPR Status

- IPR holders: FORTH, ARMINES
- IPR regime: Joint ownership

Sustainability Outlook

Strong points:

- Alignment with contemporary pedagogical models
- Flexibility across learning modalities
- Applicability beyond the craft domain

3.4.3 Haptic Interfaces for Craft Training, Simulation, and Design

Description of the Final Exploitable Outcome

WP4 delivered interactive haptic interfaces that simulate the tactile sensations of tool use and material interaction during craft actions. These interfaces support the development of dexterous motor skills and the cultivation of tactile sensitivity central to craftsmanship.

At project end, the haptic system enables:

- Realistic simulation of surface textures and resistance
- Repetitive, risk-free practice of craft actions
- "Education of attention" to material qualities and tactile feedback
- Integration with Craft Studio and Apprentice Studio simulations

The system supports preparatory training before physical workshop practice and complements visual simulation with embodied tactile learning.

Exploitation Route Selected

- Craft education and training
- Simulation-enhanced skill acquisition
- Research on embodied interaction

Post-Project Exploitation Measures Taken

- Use of haptic prototypes in Craeft demonstrations and pilots.

- Continued research and exploitation by partners in haptic interaction and training systems.
- Conceptual reuse in domains requiring fine motor skill development.

Actors Responsible and IPR Status

- IPR holders: ETH, FORTH
- IPR regime: Joint ownership

Sustainability Outlook

Sustainability is supported by:

- Compatibility with evolving haptic devices
- Strong relevance to embodied learning research
- Transferability to rehabilitation and training domains

3.4.4 Games and Toys for Craft Learning and Engagement

Description of the Final Exploitable Outcome

WP4 developed a set of digital games and physical toys aimed at introducing craft concepts through playful, simplified, and accessible experiences. These outputs target broad audiences, including children, families, and non-specialists, lowering barriers to engagement with crafts.

At project end, the outcome includes:

- Digital games, accessible on desktop and mobile devices, featuring guided learning journeys with rewards and feedback
- Physical toys, including 3D-printed tools made from recyclable plastic, enabling hands-on creative play
- Simplified representations of craft actions, tools, and processes

Together, these elements support informal learning, public outreach, and early skills development, complementing the more advanced training tools of WP4.

Exploitation Route Selected

- Public engagement and informal learning
- Educational games and creative toys
- Outreach for cultural heritage and crafts

Post-Project Exploitation Measures Taken

- Use of games and toys in demonstrations, exhibitions, and outreach events.
- Reuse of concepts and assets in educational and creative initiatives.
- Exploration of collaborations with cultural and educational organisations.

- IPR holders: FORTH, KHORA
- IPR regime: Joint ownership

Sustainability Outlook

Physical toys, in particular, carry an advantage that purely digital outputs do not: they require no installation, no device compatibility check, and no internet connection. A 3D-printed spindle handed to a ten-year-old at a museum event does not expire. That simplicity is both a distribution asset and a long-term sustainability guarantee that the more technically sophisticated tools cannot match.

3.5 WP5. Design

WP5 focused on translating Craeft's craft knowledge representations, simulations, and educational tools into design-oriented environments, production workflows, and community-driven ecosystems. At project end, WP5 delivered a set of design, manufacturing-integration, and community platforms that enable craft-inspired design, experimentation, and valorisation beyond training contexts.

3.5.1 Design Studio and Computer-Aided Design

Description of the Final Exploitable Outcome

The Design Studio is a virtual design workspace that integrates computer-aided design (CAD), AI-supported design processes, simulation, and workflow planning for craft-based creation. It builds on the simulation, haptic, and immersive technologies developed in WP3 and WP4, extending them toward creative design and production-oriented use cases.

At project end, the Design Studio supports:

- Craft-specific 3D design tools, tailored to the constraints and affordances of selected crafts (e.g. glassblowing, marble carving, woodwork)
- AI-assisted design exploration, enabling variation, refinement, and conceptual experimentation
- Haptic interaction, allowing designers to engage with digital artefacts through tactile feedback
- Integration with CAD workflows, supporting precision, iteration, and technical consistency
- Immersive artefact previews in virtual and mixed-reality environments
- Links to physical fabrication workflows, enabling the transition from virtual design to material production

The Design Studio functions as a hybrid space between traditional craftsmanship and digital design, supporting both training and professional creative practice.

Exploitation Route Selected

- Creative and design industries
- Craft-inspired product development

- Research and experimental design environments

Post-Project Exploitation Measures Taken

- Use of the Design Studio as a demonstrator for craft-based digital design workflows.
- Reuse of design concepts and software components in follow-up research and creative projects.
- Continued exploitation by partners as a prototype framework for immersive craft-aware design tools.

Actors Responsible and IPR Status

- IPR holders: KHORA, FORTH, ETH, CETEM
- IPR regime: Joint ownership under the Craeft GA

Sustainability Outlook

Enabling conditions:

- Compatibility with standard CAD and immersive technologies
- Applicability beyond the specific crafts addressed in Craeft
- Relevance to emerging craft–technology hybrid practices

3.5.2 Additive and Subtractive Manufacturing Integration

Description of the Final Exploitable Outcome

WP5 delivered a manufacturing integration framework that connects the Design Studio with additive and subtractive fabrication technologies, enabling users to explore how digital craft designs translate into physical production.

At project end, the framework includes:

- A software toolchain for integrating fabrication technologies into design workflows
- Evaluation and comparison of additive manufacturing methods (e.g. FDM, SLA)
- Evaluation and comparison of subtractive methods (e.g. milling, laser cutting)
- Interfaces designed in collaboration with craft training and production organisations
- Simplified workflows aimed at educational and SME contexts

The framework supports informed decision-making regarding fabrication techniques, materials, and production constraints, reinforcing the link between design intent and material realisation.

Exploitation Route Selected

- Craft and design education
- SMEs and small-scale production
- Research on digital fabrication and craftsmanship

Post-Project Exploitation Measures Taken

- Use of the framework as a reference model for integrating fabrication into craft-oriented design environments.
- Reuse of evaluations and workflows in educational and research contexts.
- Transfer of integration principles to other maker- and fabrication-oriented initiatives.

Actors Responsible and IPR Status

- IPR holders: KHORA, FORTH, CETEM
- IPR regime: Joint ownership

Sustainability Outlook

Sustainability factors:

- Alignment with widely adopted fabrication technologies
- Focus on modular and extensible integration
- Applicability across multiple craft and maker contexts

3.5.3 Community Portal for Craft Exchange and Valorisation

Description of the Final Exploitable Outcome

WP5 delivered an online community portal designed to support creative exchange, education, craft valorisation, and entrepreneurship. The portal provides a digital ecosystem where stakeholders can engage with craft knowledge, products, training materials, and each other.

At project end, the portal supports:

- Craft education and training content, including links to Craeft tools and resources
- Presentation and valorisation of craft products
- Branding, reputation-building, and online previews for craftspeople and micro-businesses
- Promotion of European craft heritage, identity, and contemporary practices
- Community interaction, knowledge sharing, and collaboration

The portal functions as a connector between craft practice, cultural heritage, and digital entrepreneurship, extending the impact of Craeft beyond technical tools.

Exploitation Route Selected

- Craft valorisation and dissemination
- Support for micro-businesses and entrepreneurship
- Cultural heritage promotion

Post-Project Exploitation Measures Taken

- Use of the portal as a dissemination and engagement platform during and after the project.
- Reuse of its structure and content approach in craft-related initiatives.
- Engagement with craft, heritage, and education stakeholders to explore future extensions.

Actors Responsible and IPR Status

- IPR holders: MDE, FORTH, CNR
- IPR regime: Joint ownership

Sustainability Outlook

Sustainability factors:

- Use of standard web technologies
- Relevance to ongoing craft and heritage ecosystems
- Flexibility to host new content and communities

4 Common Exploitation Objectives

Craeft's exploitation strategy was developed as a shared and coordinated process, grounded in continuous analysis of project results, stakeholder engagement, and partner-driven priorities. By the end of the project, exploitation objectives had been consolidated into a coherent framework addressing joint exploitation, individual partner exploitation, and opportunities for third-party uptake.

Rather than focusing solely on commercialisation, Craeft adopted a plural exploitation approach, recognising the diversity of partner profiles (research organisations, SMEs, heritage institutions, training centres) and the hybrid nature of outputs, which span software platforms, methodologies, educational tools, ontologies, and creative practices.

The exploitation objectives were articulated along three complementary directions:

- A joint exploitation framework for the Craeft Consortium
- Individual exploitation pathways for each partner
- Exploitation opportunities for third parties beyond the consortium

4.1 Joint Exploitation Framework of the Consortium

At the consortium level, partners converged on a shared objective to preserve, maintain, and valorise the Craeft ecosystem beyond the project lifetime. This ecosystem includes software components, platforms, methodological frameworks, training content, and demonstrators developed across the work packages.

The joint exploitation framework focuses on:

- Sustaining the Craeft software platforms, including the Craeft Authoring Platform, Studios, and associated services
- Maintaining and disseminating the Craeft knowledge base, including ontologies, datasets, and training materials
- Promoting Craeft outcomes through targeted dissemination activities, demonstrations, and stakeholder engagement
- Enabling further development and customisation of Craeft components for external users, institutions, and projects

Throughout the project, exploitation discussions were coordinated at the consortium level, ensuring alignment between technical development, user needs, and long-term sustainability. The consortium evaluated exploitation routes not only in terms of direct commercialisation, but also through research continuation, institutional adoption, service provision, and integration into educational and cultural infrastructures.

This joint framework provides a shared reference model that partners can build upon independently, while preserving coherence and interoperability across Craeft outcomes.

4.2 Exploitation Plans of Individual Consortium Partners

In parallel with the joint framework, each partner defined and pursued individual exploitation plans aligned with their institutional mission, expertise, and strategic objectives. These plans reflect the diversity of the consortium and the broad applicability of Craeft results.

4.2.1 Research and R&D Partners

Research partners exploited Craeft outcomes primarily through:

- Scientific impact and visibility, including publications, datasets, and methodological contributions
- Follow-up research projects, both European and national, building on Craeft technologies and concepts
- Transfer of knowledge and technology into applied research, pilot deployments, and collaborations with industry and cultural institutions

For example:

- Partners with strong backgrounds in immersive technologies and cultural heritage leveraged Craeft results to strengthen existing activities in mixed reality, semantic representation, and digital heritage systems.
- Expertise developed in motion capture, body tracking, and action modelling opened new exploitation paths in both academic and applied contexts.

ARMINES, for instance, has already embedded the Craeft ethnographic protocol into the ENAMOMA Master's course on Human-Centred AI, an EU-funded interdisciplinary programme bridging art, design, and technology. FORTH has initiated a collaboration with the Bezalel Academy of Arts and Design around porcelain craftsmanship. These are not aspirational plans; they are live activities that illustrate how Craeft research outcomes migrate naturally into new institutional homes.

4.2.2 SMEs and Technology Providers

SME partners focused on:

- Advancing their technological offerings, particularly in VR, simulation, and interactive systems
- Integrating Craeft concepts and components into existing or emerging products and services
- Expanding market reach in education, training, cultural heritage, and creative industries

Craeft provided SMEs with validated use cases, demonstrators, and user feedback, strengthening their capacity to exploit immersive and simulation-based technologies in professional contexts.

4.2.3 Cultural Heritage Institutions

Cultural heritage (CH) partners exploited Craeft outcomes by:

- Enhancing the semantic integration of their digitised collections
- Using Craeft platforms for authoring, annotating, and linking craft-related knowledge
- Developing new educational and mediation experiences for the crafts they preserve and promote

Craeft enabled CH institutions to move beyond static digitisation toward process-oriented, practice-based representations of crafts, reinforcing their role in craft preservation and transmission.

4.2.4 Craft Training Organisations

Craft training organisations benefited from a fully developed education and training intervention, access to immersive, simulation-based training tools, and new approaches to documenting, teaching, and validating craft practices. Together, these outcomes support both initial training and lifelong learning, strengthening the sustainability of craft education.

CERFAV, for example, is piloting the integration of Craeft's e-learning materials directly into its official French craft training curricula, with particular focus on glassblowing. What this has required in practice is not just importing digital content, but rethinking how knowledge that is fundamentally tactile and embodied gets scaffolded across a blended learning sequence. That pedagogical challenge, not the technology itself, is where the hardest design work is happening."

4.3 Exploitation Opportunities for Third Parties

Beyond the consortium, Craeft outcomes open significant opportunities for **third-party exploitation**, particularly in education, training, heritage, and creative industries.

A central insight is that craft teaching and apprenticeship are integral to craft representation itself. In Craeft, teaching processes are explicitly modelled and embedded within the representation of craft actions, tools, materials, and decision-making.

This approach enables third parties to:

- Author training instructions and learning experiences directly from craft representations
- Deploy remote and hybrid training scenarios, addressing geographical constraints and a lack of instructors
- Support self-guided and assisted learning, reducing barriers to entry into craft education
- Introduce validation and feedback mechanisms, helping counter learner demotivation and uncertainty

The Craeft eLearning platform and Studios provide a foundation for:

- Training at different initiation levels
- Supporting apprentices, educators, and institutions lacking physical training infrastructure
- Preserving and transmitting craft knowledge in a scalable and adaptable way

These features make Craeft outcomes particularly relevant for:

- External craft schools and training centres
- Cultural and educational institutions
- Creative communities and maker spaces
- Policy-driven initiatives focused on skills, heritage preservation, and sustainable craftsmanship

4.4 Overall Exploitation Vision

Taken together, Craeft's exploitation strategy balances joint and individual interests, supports non-commercial, commercial, and hybrid exploitation paths, and ensures the transferability and long-term relevance of the results. It also positions Craeft as a foundational ecosystem for future work on craft digitisation, education, design, and preservation. Rather than relying on a single business model, Craeft delivers a **portfolio** of exploitable assets that can be adapted to different contexts, stakeholders, and time horizons.

5 Exploitation Achievements

Craeft, funded by the EU and focused on understanding and preserving crafts, has produced a wide range of exploitable results with significant implications for commercialisation, collaboration, and knowledge dissemination. These opportunities span beyond technological advancements, reflecting the project's holistic approach to cultural heritage.

Craeft is committed to fully exploring exploitation opportunities by engaging all partners, including academic institutions, industries, and cultural heritage stakeholders. Partners focused especially on the potential to offer services developed as commercial products or through free or subscription-based services, ensuring accessibility for a variety of user groups.

Intellectual Property (IP) considerations have been central to the project, with mechanisms in place to safeguard and maximise the potential of the cooperative work among partners. This strategic approach ensures that the innovative solutions created within Craeft can be effectively used for both commercialisation and future research initiatives.

The project's extensive expertise in digital technology has enabled the preservation and transmission of invaluable craft knowledge integral to Europe's cultural heritage. The solutions identified through Craeft offer crucial benefits in the systematic research, recording, and representation of crafts, benefiting individual partners and enriching the broader European cultural landscape.

Looking ahead, the consortium is eager to further develop these exploitation opportunities by establishing local partnerships and offering the project's outcomes to relevant stakeholders. By doing so, Craeft aims to drive economic growth and innovation while fostering a deeper appreciation and understanding of Europe's cultural heritage both locally and globally.

5.1 MDE

MDE has actively promoted the Egocentric Recording Methodology within the Ethnographic Protocol, emphasising its role in craft documentation and knowledge transmission. At the WCC Europe Annual Meeting in Barcelona, MDE showcased the egocentric recording approach and video elicitation method, encouraging its wider adoption by WCC members and craft professionals.

MDE will utilise the Communities forum to not only promote final artefacts but to advocate for the revitalisation of local supply chains (e.g., local wool processing), linking artisans with sustainable raw-material providers to meet the European Green Deal objectives.

MDE further integrated the Ethnographic Protocol within the MindCrafts ERASMUS+ project, collaborating with La Table Ronde de l'Architecture (Belgium), Confartigianato Udine (Italy), and CEFS Udine (Italy).

Additionally, the Ethnographic Protocol has enriched and inspired MDE to interview its craft members uniquely, introducing an egocentric, first-person perspective to craft gestures. This fresh approach brings the audience closer to the details, precision, and dedication required in craftsmanship, allowing them to see each movement, technique, and effort through the artisan's own eyes. By emphasising this immersive

storytelling, MDE not only highlights the skills, experiences, and personal journeys of craftspeople but also deepens audience engagement, fostering a greater appreciation for the complexity of traditional crafts. Ultimately, this innovative narrative style raises awareness about craftsmanship, strengthens connections with artisans, and helps attract more customers to the sector.

Craeft has significantly raised MDE's visibility, positioning it as one of the key innovators in the craft sector. As a result, Madina Benvenuti has been invited to numerous conferences as a speaker, strengthening MDE's role in craft preservation, skills transmission, and heritage education. Additionally, MDE played a key role in the SIPC 2024, organising a conference and launching the CRAFTOUR Initiative alongside five other EU-funded projects (Colour4crafts, Tracks4crafts, Hephaestus, Culturality, and MOSAIC). This event marked a major step towards the exploitation of Craeft's outcomes, fostering cross-project collaboration and expanding their impact in the heritage and craft sectors.

Looking ahead, MDE, with the support of FORTH, as the CRAFTOUR Initiative coordinator, together with Colour4crafts, Tracks4crafts, Hephaestus, Culturality, and MOSAIC, is preparing a policy roundtable on January 30, 2026, in Brussels, which will bring together policymakers, educators, and craft practitioners to explore how Craeft outcomes and innovations can be integrated into broader policy frameworks.

Furthermore, MDE will leverage the Communities forum, integrated into the madineurope.EU portal to maximise the exploitation of Craeft's outcomes. Through targeted engagement strategies, MDE, with the support of FORTH, will actively use the Communities to foster discussions, share best practices, and facilitate networking among craft professionals, educators, researchers, academics and policymakers. By integrating Craeft's methodologies and research findings within its madineurope.eu portal, MDE, will enhance knowledge-sharing and create a sustainable impact beyond the project's duration.

The Communities forum will also serve as an additional asset for MDE members of the portal, offering a dedicated space for exchange, collaboration, and peer support. This interactive forum will enable craft professionals to discuss trends, share their opinions about technological and innovation advancement in the crafts sector, seek advice on technical challenges or business opportunities and much more. Additionally, the forum will support and encourage cross-disciplinary collaboration, encouraging synergies and brining closer craftspeople, designers, researchers, and cultural heritage professionals. Enriching the existing digital ecosystem of Madineurope.eu portal.

The CRAFTOUR policy roundtable serves as the primary vehicle for 'Policy Uptake,' where Craeft's advanced scanning and simulation results will be presented as evidence-based models for future Horizon Europe calls.

5.2 Khora

Khora's engagement with Craeft was initially driven by curiosity about the cultural heritage sector rather than a clear commercial thesis. What became apparent was that the VR training design workflows developed for craft transmission were more transferable than anticipated, particularly in professional skills training contexts where tacit knowledge is similarly difficult to capture through conventional instruction. Khora is now applying these workflows outside the heritage domain.

Khora has employed a comprehensive strategy to promote and integrate Craeft outcomes across its operations, emphasising both outreach and internal integration.

Khora has effectively utilised social media platforms to broadcast the successes and advancements made through Craeft. This approach has not only informed a broader audience about Khora's capabilities in managing tangible cultural heritage but also showcased the company's innovative VR training solutions.

By fostering direct engagement with clients and partners through face-to-face meetings, Khora has promoted the Craeft outcomes in a more personalised and impactful manner. These interactions have enabled tailored demonstrations and in-depth discussions and have strengthened key business relationships.

The insights and technological advancements gained from Craeft have been successfully integrated into Khora's core production processes. Particularly, the project's innovative VR training design systems have been adapted into Khora's existing workflows, enhancing the development and deployment of cutting-edge VR training solutions.

Promoting Craeft has allowed Khora to build new business relationships and strengthen existing ones. These expanded networks have led to valuable collaborations, contributing significantly to Khora's growth and diversification in both the cultural heritage and training sectors.

Through its proactive approach in showcasing the Craeft outcomes, Khora has seen a marked increase in visibility and market reputation. This heightened profile has attracted new clients and positioned Khora as a thought leader at the intersection of cultural heritage preservation and innovative VR training technologies.

Craeft has had a profound impact on Khora, not only by improving internal process efficiencies but also by broadening the company's presence within the industry and enhancing client engagement. As Khora continues to integrate and build upon these outcomes, the company is well-positioned to lead and innovate in the convergence of VR training and cultural heritage preservation.

5.3 ARMINES

ARMINES actively integrated and promoted the project outcomes through a series of events, fostering both academic and professional engagement across the sectors directly connected to Craeft. At the Salon du Patrimoine 2025, held at the iconic Pyramids of the Louvre Museum, we had the opportunity not only to present our technical methodology but also to engage in meaningful exchanges with researchers from other EU projects focused on crafts. This event catalysed expanding our network within the cultural heritage community, highlighting the relevance of our ethnographic protocols in preserving and digitising traditional knowledge. Building on this momentum, we introduced our recording protocol and methodological framework during the ENAMOMA Master's course on Human-Centred AI in Cultural and Creative Industries, an interdisciplinary program bridging art, design, and technology. Our presence there allowed us to showcase the practical applications of our project within the creative industries, sparking discussions on how human-centred AI can support cultural preservation and innovation, perfectly aligning with the goals of Craeft.

Further advancing our outreach, ARMINES organised the conference "How Can Industries Operate Through AI ACT?", a pivotal event that brought together leaders from AI, cultural sectors, and creative industries to explore the intersection of regulatory frameworks and technological innovation. The conference delved into critical themes such as the impact of the EU's AI ACT on industrial practices, the

future of manual professions in the era of AI, and the challenges faced by creative industries in adapting to new AI-driven paradigms. The rich dialogues that emerged not only fostered new collaborations across disciplines but also laid the groundwork for the forthcoming manifesto, "Working with Artificial Intelligence in Cultural and Creative Industries: A Manifesto for the Application of the AI ACT," reflecting our commitment to ethical and responsible AI integration.

Collectively, these initiatives have significantly contributed to the growth and visibility of our organisation and Craeft. They have strengthened our interdisciplinary networks, enriched our methodological approaches, and positioned us in fruitful discussions on AI's role in cultural heritage and creative industries. Through these activities, we have not only disseminated the project's outcomes but also actively shaped the evolving discourse on human-centred AI within both academic and professional communities.

5.4 CERFAV

The integration of Craeft project results is an ongoing process, with experimentation paving the way for new applications within the official French craft training curricula. A key focus is on enhancing synergies between traditional knowledge transmission and digital tools by integrating e-learning platforms more effectively with in-situ learning.

Additionally, Work Package 6.3 is exploring new opportunities for animating boutique workshop sales areas, further expanding the project's impact.

Parallel developments in the French national initiative for arts and crafts have also fostered partnerships and synergies with French research teams in the Resource project, where knowledge exchanges are already underway. The deeper integration of e-learning into training processes is expected to prompt a partial rethinking of organisational structures, particularly regarding knowledge and skill transmission at Cerfav. This aspect will be further examined and refined in the final version of WP6.1.

5.5 CETEM

The various outcomes of Craeft will be integrated into CETEM's ongoing activities, with the goal of enhancing and preserving woodcarving knowledge. Through its participation in Craeft, CETEM has made new connections with woodcarving artisans and furniture designers eager to share their expertise, ensuring that these results will be sustained over time.

As part of this integration, training materials and an e-learning course will be incorporated into CETEM's existing training program. Additionally, a specialised design tool will be developed to support woodcarving practices, and an interactive visit will be organised to explore the history, key locations, and cultural significance of this craft in Yecla, strengthening its transmission and awareness.

Beyond training, Craeft has enriched CETEM's expertise in woodcarving, enhancing the skills of its Design Department staff and establishing a new research focus in this area. The project has also expanded CETEM's network by fostering new connections with artisans, companies, and experts, broadening its influence. Ultimately, these developments are expected to increase CETEM's visibility, particularly in the fields of training, design, and tourism, reinforcing its role as a key player in the local industry.

One tension worth acknowledging: much of the craft knowledge in focus at CETEM, woodcarving traditions rooted in the furniture-making culture of Yecla, is held by artisans who are not always comfortable with digital documentation. Building trust with those practitioners, rather than any technical challenge, was the primary constraint on the pace of CETEM's exploitation activities."

5.6 FORTH

FORTH has enhanced its research network and initiated new collaborations through the implementation of Craeft outcomes. Noteworthy exploitation of Craeft results includes its collaboration with SceneOpsis, which has revolutionised smartphone video content by transforming it into photorealistic virtual tours, advancing digital documentation methods.

Additionally, FORTH is partnering with Lena Dubinsky from the Bezalel Academy of Arts and Design to explore porcelain art and with Reham Khaled on alabaster craftsmanship in Luxor through the RCI. An upcoming collaboration with Linardaki-Parisot, textile artists, will leverage the advanced scanning technologies developed through Craeft, specifically the High-Resolution 2D and 2½D surface scanning. This innovative tool, which exceeds 1 gigapixel per square centimetre, provides unparalleled resolution and incorporates photogrammetry to capture depth, offering a richer, more complete representation of textile artworks. Through this technology, the intricacies of textile patterns, textures, and even tactile qualities like smoothness or coarseness can be documented with exceptional precision.

The 2½D scanning technique will also enable a more comprehensive digital record, preserving not only the visual aspects of the textiles but also the subtle tactile qualities that are central to understanding their craftsmanship and historical significance. By integrating this advanced scanning technology, the collaboration with Linardaki-Parisot will open new possibilities for her artistic expressions.

Together with MDE, FORTH is working on the CRAFTOUR Initiative policy roundtable on January 30, 2026, in Brussels. This event will bring together policymakers, educators, and craft practitioners to explore how Craeft outcomes and innovations can be integrated into broader policy frameworks. In addition to the policy roundtable, FORTH is also collaborating with CRAFTOUR projects (Colour4crafts, Tracks4crafts, Hephaestus, Culturality, and MOSAIC) on a scientific conference, which will take place on January 29, 2026, in Antwerp. This conference will provide an opportunity for experts and researchers to present and discuss the latest findings, contributing to the ongoing dialogue on advancing the craft sector.

The CRAFTOUR policy roundtable serves as the primary vehicle for 'Policy Uptake,' where Craeft's advanced scanning and simulation results will be presented as evidence-based models for future Horizon Europe calls.

5.7 PIOP

PIOP has contributed to Craeft across multiple work packages, leveraging its unique position as a cultural heritage institution with deep expertise in Greek craft traditions to ground the project's technological developments in authentic, practice-based craft knowledge.

Throughout the project, PIOP engaged directly in the documentation and semantic representation activities, contributing to the ethnographic recording of craft practices in line with the Craeft protocol. The multimodal datasets collected across PIOP's craft domains were used as inputs for the Craft-Specific Action Simulators and the Scene and Activity Monitoring framework. PIOP's domain knowledge proved

essential in validating the semantic coherence of the Craft Ontology (CrO) with respect to real craft practices and their contextual attributes.

As an IPR co-holder in several key Craeft outcomes, PIOP is well-positioned to exploit these results within its museum and heritage education programmes. Specifically, PIOP plans to integrate the immersive simulation tools and digitisation technologies developed through Craeft into its network of thematic museums, offering enriched visitor experiences and educational programmes centred on the living traditions of Greek craftsmanship.

Looking ahead, PIOP intends to continue leveraging the Craeft Authoring Platform (CAP) and the Community Portal as tools for publishing and promoting the craft knowledge documented within its collections, contributing to the long-term visibility of European intangible cultural heritage. PIOP will also explore synergies with national cultural heritage digitalisation initiatives to sustain and extend the outcomes of Craeft beyond the project's lifetime, in line with the consortium's joint exploitation framework.

5.8 ETH

ETH has contributed to Craeft primarily through its involvement in the development of simulation, haptic, and design-oriented tools, playing a key technical role across Work Packages 4 and 5. As an IPR co-holder for the Craft Studio, the Haptic Interfaces for Craft Training, and the Design Studio, ETH has been directly engaged in shaping how craft knowledge is translated into interactive and immersive digital experiences.

In the context of the Craft Studio, ETH contributed to the development of the game-engine-based simulation and authoring environment that bridges formal craft knowledge with experiential digital scenarios, enabling practitioners and learners to visualise and rehearse crafting procedures across multiple devices, including MR/VR headsets and haptic interfaces. ETH's expertise further extended to the Haptic Interfaces component, where it contributed to the design and implementation of tactile simulation systems that replicate surface textures and tool resistance, enabling the "education of attention" central to the transmission of embodied craft skill.

Through its co-ownership of the Design Studio, ETH also contributed to the development of the craft-aware computer-aided design environment, which integrates AI-assisted design exploration, haptic interaction, and immersive previews to support both research-oriented and professional creative practice. These contributions position ETH strongly to continue exploiting the simulation and immersive technology components of Craeft within its own research and educational activities, particularly in domains involving embodied interaction, motor skill training, and digital fabrication.

Looking ahead, ETH intends to build on the technical foundations established through Craeft by integrating the haptic and simulation frameworks into follow-up research initiatives and exploring the transfer of these methods to domains beyond craftsmanship where fine motor skill development and embodied interaction are equally critical.

5.9 CNR

CNR's most significant contribution lies in the development of the Maker–Material–Negotiation Model, of which it is an IPR co-holder alongside FORTH, CETEM, CNAM, PIOP, and CERFAV. This extended ontology, encoded in RDF Schema and OWL 2 DL and aligned with the CIDOC-CRM standard, provides the semantic backbone of the entire Craeft platform. It formally represents tools, materials, workspaces, action plans, and contextual narratives that characterise real crafting processes. CNR's deep expertise in semantic web standards and cultural heritage data models was decisive in ensuring that this outcome is both computationally rigorous and interoperable with international CH infrastructures such as Europeana.

6 Conclusion

The strength of the Craeft approach lies in its holistic view of exploitation, which encompasses commercial services, institutional adoption, and societal impact. Through the CRAFTOUR initiative, we have aligned our technological innovations with broader European policy goals, positioning traditional crafts as dynamic contributors to the European Green Deal and the Digital Decade. As we transition from a funded project to a self-sustaining ecosystem, the following roadmap outlines the critical milestones for the next five years.

Next Steps: Strategic Exploitation Roadmap (2026–2031)

This roadmap provides a phased approach to ensure the structural integration of project results into the European socio-economic landscape.

Phase 1: Immediate Stabilisation and Visibility (0–1 Years / 2026)

- Policy Roundtable (Brussels, Jan 2026): Present evidence-based models to European policymakers to ensure Craeft outcomes inform future Horizon Europe and Creative Europe funding priorities.
- CRAFTOUR Scientific Conference (Antwerp, Jan 2026): Disseminate final research findings to the academic community to stimulate follow-up innovation projects.
- Micro-Grant Mobilisation: Support individual artisans and micro-SMEs in accessing regional funding for the adoption of digital e-commerce and documentation tools.
- Legacy Hosting: Ensure all core platforms, specifically the Craeft Authoring Platform and Studios, are hosted and maintained by lead partners to prevent service disruption for third-party adopters.

It is worth being honest about what this roadmap can and cannot guarantee. Phase 1 actions are within the consortium's direct control. Phase 2 and Phase 3 actions depend heavily on institutional decisions, national policy timelines, and funding environments that are not. The roadmap is therefore best read as a statement of intent and a basis for future negotiations rather than a binding operational plan.

Phase 2: Structural Integration (1–3 Years / 2027–2029)

- VET Curricula Adoption: Integrate the Apprentice Studio and Haptic Interfaces into at least three national Vocational Education and Training (VET) frameworks (e.g., France, Greece, and Spain).
- Cultural Tourism Routes: Collaborate with regional tourism boards to launch "Living Workshop" routes that utilise Craeft's high-resolution 2D/2½D scanning and AR/VR previews to attract visitors.
- Supply-Chain Revitalisation: Use the Community Portal to link artisans with sustainable raw-material providers, addressing the "middle-ground" infrastructure gaps identified.

Phase 3: Resilient Prosperity and Scaling (3–5 Years / 2029–2031)

- European Digital Repositories: Transition the Craeft knowledge base into a shared, permanent European infrastructure for the preservation of tacit craft knowledge.

- PGI and Quality Certification: Finalise EU-level frameworks for craft authenticity and geographical indications (PGI) using Craeft's provenance tracking methodologies.
- Market Expansion: Support the transition of the Design Studio into a commercial-grade tool for the creative industries, enabling craft-inspired product development on a global scale.