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Abbreviations

Abbreviations	Full name
AAPS	AI-based Audience Preferences Scouting tool
ABT	Audience Building Tool
AI	Artificial Intelligence
API	Application Programming Interfaces
AR	Augmented Reality
AV	Audiovisual
BG	Background
BM	Business Model
CA	Consortium Agreement
CAGR	Compound Annual Growth Rate
CCI	Cultural and Creative Industries
CDN	Content Delivery Network
CMS	Content Management System
DAM	Digital Asset Management
DRM	Digital Rights Management
EM	Exploitation Manager
EU	European Union
FG	Foreground
GA	Grant Agreement
GCS	Google Cloud Storage
GDP	Gross Domestic Product
IP	Intellectual Property
IPR	Intellectual Property Rights



KER(s)	Key Exploitable Result(s)
KPI(s)	Key Performance Indicator(s)
LiDAR	Light Detection and Ranging
MAM	Media-Asset-Manager
MVP	Minimum Viable Product
NFT	Non-Fungible Token
NLP	Natural Language Processing
NoI	Network of Interest
OTTV	over-the-top television
SEO	Search Engine Optimization
SSO	Single Sign-On
UK	United Kingdom
US	United States
VoD	Video on Demand
VR	virtual reality
WP	Work Package



Publishable summary

The digital transformation of the filmmaking industry is underway, propelled by emerging technologies that redefine how content is created, distributed, and consumed. The SCENE project is at the forefront of this evolution. Deliverable D6.2, titled "Market Analysis, Business Model Definition, and Exploitation Strategy," encapsulates the preliminary outcomes of Task 6.2.

The primary objective of Task 6.2 is to conduct a comprehensive market analysis and define the preliminary business models of the project's innovations, with a focus on SCENE's key exploitable results (KERs). This deliverable serves as a guide for stakeholders, providing insights into the evolving landscape of the digitally-enabled film industry and outlining strategic approaches for the successful deployment of SCENE's key exploitable results.

The deliverable unfolds through various chapters, covering an overview of the digitally-enabled film industry, tool landscape analysis, trend analysis, needs evaluation, assessment of market forces, lean value proposition, business model generation, and future plans for validation of said models. Deliverable D6.2 holds strategic importance within the SCENE project, acting as a roadmap for integrating digital technologies into the filmmaking value chain. The insights derived from the market analysis and business model formulation contribute to the project's overarching goal of fostering innovation and sustainability in the European filmmaking landscape.

As we navigate through Task 6.2, the SCENE project anticipates valuable insights, innovative business models, and a strategic exploitation plans that not only shape the project's trajectory but also contribute to the broader evolution of the digitally-enabled film industry in Europe.



1 Introduction

1.1 Background

The digital transformation of the filmmaking industry represents a paradigm shift, with emerging technologies redefining content creation, distribution, and consumption. This transformative journey is at the core of the SCENE project. Task 6.2, titled "Market Analysis, Business Model Definition, and Exploitation Strategy," marks a crucial phase in this endeavor.

1.2 Scope of Deliverable D6.2

Deliverable D6.2 encapsulates the preliminary outcomes of Task 6.2, providing a detailed account of the market analysis and business model definition. The deliverable serves as a guide for stakeholders, offering insights into the evolving landscape of the digitally-enabled film industry and outlining strategic approaches for the successful deployment of SCENE's key exploitable results.

1.3 Structure of the Deliverable

The deliverable is structured to facilitate a comprehensive understanding of Task 6.2. It comprises various chapters, each focusing on specific aspects such as the overview of the digitally-enabled film industry, tool landscape analysis, trend analysis, needs evaluation, assessment of market forces, lean value proposition, business model generation, and future plans for validation of the model generated.

1.4 Significance of the Deliverable

Deliverable D6.2 holds strategic importance within the SCENE project, serving as a roadmap for the integration of digital technologies into the filmmaking value chain. The insights derived from the market analysis and business model formulation contribute to the project's overarching goal of fostering innovation and sustainability in the European filmmaking landscape.

2 Methodology

This section provides a detailed overview of the methodology employed in Task 6.2. The task is designed to explore concepts critical for a digitally-enabled film industry, focusing on specific tools and concepts. The methodology unfolds through a series of key steps, ensuring a systematic and thorough analysis:

1. Tool Landscape Analysis:

The initial phase involves an in-depth analysis of the tool landscape, categorizing tools and concepts based on functionality and their contributions to enhancing the competitiveness of the European filmmaking industry. This categorization, incorporating insights from the SCENE project's Key Exploitable Results (KERs), provides a comprehensive understanding of the diverse digital tools within the film ecosystem.

2. Trend Analysis:

A forward-looking trend analysis is conducted, encompassing emerging technologies and functionalities within the digital film industry. The analysis included insights provided by market and industry reports, as well as news from relevant articles and blogs within the filmmaking industry.

3. Evaluation of Filmmaking Value Chain Needs:

The project places a strong emphasis on understanding the needs of various stakeholders within the filmmaking value chain.

4. Assessment of Market Forces:

This analysis, intertwined with the SCENE project's Key Exploitable Results, provides valuable insights into potential challenges, helping shape effective business strategies.

5. Business Model Canvas:

The Business Model Canvas methodology and lean value proposition design are strategically employed. This approach facilitates the formulation of indicative business models, providing a structured and visual representation of key components such as customer segments, value propositions, channels, customer relationships, revenue streams, key resources, key activities, key partnerships, and cost structure.

3 SCENE's Identified Key Exploitable Results

The key exploitable results (KERs) of the SCENE project, identified in Task 6.4 and reported in D6.4: IPR Management & Ecosystem Development, form the backbone of the innovative tools developed within WP3 and WP4. These results represent transformative tools designed to revolutionize various facets of the filmmaking process. As the project progressed, the lead partners and their collaborators defined the core functionalities of each KER. These functionalities, summarized below, showcase the diverse and transformative capabilities of the SCENE platform.

Table 1: SCENE's Identified Key Exploitable Results

KER	Lead partner	Involved Partners	Core Functionalities
KER1 - Semantic enriched data lake	UPV	CERTH, DTT, AUTH, CETMA	<ul style="list-style-type: none"> Unified self-expandable Knowledge Graph Integration with open/existing data lakes Automatic knowledge extraction for metadata and keywords Clustering of knowledge for linked data compliance. Utilization of ontology for semantic representation
KER2 - Media-Asset-Manager (MAM)	MOG	HYPERTECH, LINKS, DTT, FOKUS	<ul style="list-style-type: none"> Allows users to manage, classify and monetize content Capability to ingest content in various formats. Support for diverse multimedia material. Classification and categorization of raw multimedia data. Creation of collections and bundles for organized content management Support for different types of content licensing Content exploration mechanisms
KER3 - EU Cultural Heritage 3D Modelling	DTT	CERTH, AUTH, GOF, CETMA	<ul style="list-style-type: none"> Precise 3D Reconstruction with terrestrial laser scanning and 3D photogrammetric systems Parametrization of audio and light Settings Offers better understanding of real environments Enriches film-related data with detailed 3D models 3D models generated can be utilized in the post-production stage
KER4 - Blockchain-based IPR preservation platform	CERTH	HYPERTECH, LINKS, MOG, FOKUS, GOF	<ul style="list-style-type: none"> Generates decentralized, automatic, secure, and legally binding licensing agreements Smart contracts for licensing control Integrates human-readable, legally binding, and verifiable Ricardian contracts Explores and creates a blockchain-based economic model



			<ul style="list-style-type: none"> Introduces native tokens, facilitating rewards for content producers Adopts Non-Fungible Tokens (NFTs) for property tracking Integrates with existing marketplaces Integration with MAM, 3D modelling, simulations and other components generating multimedia within SCENE
KER5 - The Location Scouting Tool	CERTH	LINKS, DTT, FOKUS, AUTH, ADDMA	<ul style="list-style-type: none"> Provides access to a wide range of registered locations Enriches each location with multimedia content such as photos, videos, and 360 photos Includes metadata generated through deep learning or manually inserted by location providers Automatic extraction of metadata through deep learning techniques Offers complex content labels covering architectural style, emotional associations, materials, colors, and more Provides metrics offering insights into the geographical and infrastructural suitability of locations
KER6 - The Audience Building tool	HYPERTECH	CERTH, DTT, FOKUS, ADDMA	<ul style="list-style-type: none"> Facilitates connection and management of filmmakers' social media accounts Tracks and analyzes social media account activity Synchronizes and streamlines social media presence Provides insightful metrics on audience interactions, engagement levels and content impact Allows filmmakers to create campaigns, contests, and reward audience engagement Establishes a structured feedback loop for gathering valuable insights from the audience Enables producers to issue NFTs related to the production (KER 3) Utilizes tradeable NFTs for crowdfunding (KER 3) Offers access to a dashboard for real-time monitoring of campaigns and key KPIs Provides visualization tools to understand the impact of audience building Introduces a reward system linked to various forms of engagement
KER7 - The AI-based Audience Preferences Scouting tool	FOKUS	CERTH, HYPERTECH, EPICA, ADDMA	<ul style="list-style-type: none"> Trend prediction based on content and context, using deep learning AI Visualization of recognized trends Privacy-preserving persona creation
KER8 - Distribution Engine and Recommender system	MOG (Distribution) CERTH (Recommender)	FOKUS	<ul style="list-style-type: none"> Proposes target audiences for film and broadcast distributors using clustering methods based on audience interests, demographics, and social network interactions Enables filmmakers to swiftly create, set up, and operate over-the-top television (OTTV) channels, supporting various video formats and encodings



			<ul style="list-style-type: none"> • Recommends the most suitable platforms for distributing productions • Adaptive (Digital rights management) DRM protection for secure streaming and video-on-demand (VoD) film access • Proposes films or clips to SCENE platform users (audience) based on film information and user preferences • Utilizes clustering methods to define audience groups • Incorporates information from the Location Scouting tool (KER4) • Considers information from the Audience Building (AB) tool and campaigns organized by producers to enhance the relevance of recommendations (KER5)
<p>KER9 – SCENE complete platform</p>	<p>CERTH</p>	<p>All partners</p>	<ul style="list-style-type: none"> • Semantic Knowledge Graphs for unified data management • Efficient searching, exploration, and contextual understanding of film content • Manages the complete lifecycle of multimedia content • Integrates open/existing data lakes • Implements automatic knowledge extraction for metadata and keywords • Generates detailed 3D models of cultural sites through scanning processes • Parametrizes audio and light settings for realistic environments • Enhances post-production by integrating 3D models into multimedia products • Facilitates decentralized, automatic, secure, and legally binding licensing agreements • Utilizes smart contracts for auditability and transparency • Introduces a native token for transactions • Offers access to a database of registered locations with multimedia content and metadata, supporting filmmakers in identifying suitable shooting locations • Utilizes deep learning techniques for automatic metadata extraction • Leverages social media campaigns and gamification strategies for audience engagement • Provides real-time Key Performance Indicator (KPI) monitoring • Enables the issuance of Non-Fungible Tokens (NFTs) for crowdfunding purposes • Predicts trends based on audience viewing behavior and content interactions • Utilizes deep learning AI to recognize and predict trends • Preserves viewer privacy through persona creation and clustering algorithms

- Recommends films or clips to the audience based on film and user information

This chapter provides an exploration of each KER's potential in the SCENE project's overarching objectives. The subsequent sections of this deliverable delve into detailed market identification and analyses, market trend assessments, the generation of preliminary business models and exploitation plan preparation for each of these key results.

4 Market Analysis

This section provides an overview of the current state of the filmmaking industry, focusing on the digital aspects. It captures the size of the market, growth rates, major players, and key trends. The digitally-enabled film industry, underpinned by advanced technologies and digital solutions, has witnessed tremendous growth. The SCENE project, with its range of Key Exploitable Results (KERs), aims to further enhance the digital experience in filmmaking. This analysis examines the market potential and alignment of SCENE's KERs within this sector.

4.1 Overview of the Digitally-Enabled Film Industry

With the proliferation of digital platforms and the advancement in AI, blockchain, and digital tools, the film industry is undergoing a transformation. These digital tools are enhancing production, distribution, and audience engagement. Major streaming platforms like Netflix, Amazon Prime, and Disney+; tech giants venturing into film, like Apple and Google are now as relevant to content creation and distribution as traditional movie picture industries and broadcasters. The transition to digital in the film industry has unveiled an era of tremendous growth and transformation, profoundly influencing the modes of content production, distribution, and consumption.

Digital technology has the potential to assist in the execution of production tasks carried out by individuals such as scriptwriters, storyboard artists, musicians, costume designers, and location scouts. Additionally, it can contribute to the creation of marketing content and the strategic placement of products. Furthermore, a benefit lies in its capacity to tailor content according to the preferences of distinct target audiences¹. For instance, for the pre-production stage, Behrens et al. (2021)² demonstrated how the utilization of extensive data analysis could enhance the producers' ability to align with the desires and requirements of the audience. The examination of conversations within user forums has the potential to furnish valuable understandings into audience preferences and aversions, particularly considering the variations across different regions (Ghosh Dastidar and Elliott 2020)³.

The motion picture industry generated worldwide sales of more than US \$100 billion in 2019, with the box office at \$42.2 billion globally, while home/mobile entertainment accounted for \$58.8 billion worldwide^{4,5}. In the realms of entertainment and media, the year 2022 emerged as a significant turning point. The combined global revenue for the entertainment and media (E&M) sector experienced a 5.4% increase in 2022, reaching a total of \$2.32 trillion⁶. This marks a notable deceleration from the robust 10.6% growth observed in 2021, a time when economies and industries worldwide were rebounding from the disruptions caused by the COVID-19 pandemic. Furthermore, over the subsequent five years, the growth rate is projected to gradually diminish, resulting in a mere 2.8% revenue expansion from 2026 to 2027. In 2021, the estimated number of U.S. films that entered production was 943 (not including student films, documentaries, films created for straight to-DVD or Blu-ray releases), an increase of 111 percent compared to 2020, when production was shut down due to the COVID-19 pandemic. Of these films, 226 films had an estimated budget greater than \$15 million, a 124 percent increase compared to 2020 and a 40 percent increase compared to 2017⁷.



Focusing on Europe, at the end of 2019, the cultural and creative economy was a European heavyweight, with a turnover of €643 billion and a total added value of €253 billion. In 2019 the core activities of the cultural and creative industries (CCIs) represented 4.4% of EU GDP, in terms of total turnover, with the economic contribution of CCIs being greater than that of telecommunications, high technology, pharmaceuticals or the automotive industry. At the end of 2019, CCIs employed more than 7.6 million people in the EU-28, and they have added approximately 700,000 (+10%) jobs, including authors, performers and other creative workers, since 2013. Between 2013 and 2019, the 10 CCI sectors experienced varied but constant growth rates: more than 4% per year for video games, advertising, architecture and music; and between 0.5% and 3% for audiovisual (AV), radio, visual arts, performing arts and books. In 2019, the five largest EU-28 countries (France, Germany, Italy, Spain and the UK) accounted for 69% of CCI total revenue in the EU, but the strongest growth came from Central and Eastern Europe. Over 90% of CCI companies are small- and medium-sized enterprises, and 33% of the workforce are self-employed – more than twice as many as in the European economy as a whole (14%)⁸. Various countries of the EU continue to produce an average of 1250 films per year⁹.

CCIs have also embraced digital technologies from a marketing standpoint. In the performing arts, the use of data and the development of innovative performance management methods have, for example, further streamlined the filling of theaters or museums. CCIs have always been pioneers in the adoption of new technologies: virtual reality, augmented reality, blockchain and artificial intelligence have been deployed and experimented with by creative organizations and creators over the last decade⁸.

Entrepreneurs in the creative industries across Europe generally do not see culture and creation as a priority for national governments. Indeed, 46% of respondents to the Cultural Climate Barometer ranked the low priority of cultural sectors in government budgets as the number one issue¹⁰.

In navigating the digitally-enabled film industry's landscape, the SCENE project finds itself at the intersection of transformative technologies and burgeoning market dynamics. As we delve into the opportunities presented by major streaming platforms, technological behemoths, and independent digital film tool providers, it becomes evident that the shift to digital is not merely a trend but a paradigm shift. The global film industry, with its remarkable sales and box office figures, serves as the canvas upon which the SCENE project can paint its transformative contributions. Moreover, the broader entertainment and media sector, experiencing consistent growth, beckons the project to contribute to the unfolding narrative of this dynamic landscape. As we peer into the European stage, characterized by the resilience and dynamism of the cultural and creative industries (CCIs), we discover a thriving ecosystem ready to embrace digital innovations. From Central and Eastern Europe's emerging markets to the well-established creative landscapes of the EU-28, the SCENE project stands poised to play a pivotal role in reshaping the industry's future. Let us now explore how the project's key exploitable results align with market trends and where the strategic focal points for market penetration lie.

Evidently, the film industry is the main target market for SCENE's digital tools. The CCIs, contributing 4.4% to EU GDP, demonstrate the economic significance of the sector. Given the growth rates and employment figures, the SCENE project can align its tools with the thriving European creative landscape. CCIs in Europe have been at the forefront of adopting digital technologies, including virtual reality, augmented reality, blockchain, and artificial intelligence. The SCENE project, with its innovative digital tools, can tap into the existing momentum of digital adoption within the creative industries. While the five largest EU-28 countries contribute significantly to CCI revenue, the strongest growth is observed in Central and Eastern Europe. Targeting these regions can provide the SCENE project with opportunities to cater to emerging markets and contribute to the digital evolution of the film industry in these areas. Furthermore, the integration of digital technologies for marketing within CCIs, such as data utilization and innovative performance management methods, presents a synergistic environment for the SCENE project's tools. In summary, the SCENE project



should target global film markets, with a focus on the expansive entertainment and media sector. Europe, particularly the CCIs, offers a strategic market, leveraging the existing digital adoption trends and the project's potential to contribute to the industry's digital evolution.

4.2 Tool Landscape Analysis

The SCENE project envisions a digitally-enabled film industry, leveraging cutting-edge technologies to revolutionize content creation, distribution, and audience engagement. To achieve this ambitious goal, a comprehensive tool landscape analysis is imperative. This analysis delves into the functionalities and contributions of various tools and concepts, providing insights into the competitive landscape of the European filmmaking industry.

In the ever-evolving landscape of the film industry, the integration of cutting-edge technologies has become paramount for staying ahead of the curve. The SCENE project, in its pursuit of transforming the digital infrastructure of the European filmmaking sector, delves into a diverse array of tool categories. These categories encapsulate data lakes and ontologies, intelligent media asset management solutions, 3D modeling and scanning for cultural heritage preservation, blockchain-based intellectual property rights (IPR) and NFT platforms, location scouting tools, audience building solutions, content distribution recommenders, film recommendation systems, and more holistic platforms resembling SCENE. Each category represents a vital aspect of the filmmaking process, leveraging technology trends to address specific needs within the industry.

4.2.1 Pre-production:

4.2.1.1 Data Lakes and Ontologies:

Data lakes serve as storage hubs for extensive and diverse collections of unprocessed data. They have rapidly gained popularity as a prevalent data management option for entities seeking a comprehensive and expansive repository. With data lakes, individuals can effortlessly retrieve and investigate data without the necessity of transferring them to an alternative system. In the era of digital filmmaking, the generation and management of vast volumes of data demand innovative solutions. An ontology is a framework for defining the things, concepts and relationships that describe a domain of knowledge. It provides explicit definitions in machine-to-machine form that can be used to organize and connect data from multiple sources within the given domain. A common ontology has the potential to support and advance multiple components of the industry's core infrastructure—enterprise data systems, analytics and marketing systems, data warehousing applications, and almost any other data system that relies on integration of data from the many independent sources around the media industry¹¹. Data lakes and ontologies emerge as a crucial category, providing a structured and interconnected framework for handling diverse film-related information. The trend in the industry is shifting towards comprehensive data integration, allowing for efficient representation, naming, and definition of categories, properties, and relations within the film domain. These technologies address the need for a unified knowledge graph, enabling seamless collaboration and information exchange across various stages of film production. In the context of the SCENE project, the exploration of data lakes and ontologies aligns with the overarching goal of revolutionizing film-related data management. By establishing a self-expandable knowledge graph through the SCENE-O ontology and integrating open data lakes into the platform, the project aims to create an extensive and flexible framework for diverse film data. The solutions of this category play a foundational role in enhancing the efficiency, collaboration, and knowledge extraction capabilities within the filmmaking value chain.

The integration of Data Lakes and Ontologies in the filmmaking industry contributes greatly to the competitiveness of the EU filmmaking landscape. Through establishing a centralized repository for diverse and extensive datasets, Data Lakes enable filmmakers to access, manage, and analyze a wide range of raw

data seamlessly. This enhanced data management capability is instrumental in streamlining pre-production processes, allowing filmmakers to make informed decisions based on comprehensive insights.

Ontologies further augment this contribution by providing a structured and self-expandable knowledge graph within the Data Lakes. The development and utilization of ontologies, such as the SCENE-O ontology, facilitate efficient categorization, naming, and definition of entities, properties, and relationships specific to the film industry domain. This standardized representation enhances data interoperability and comprehension, fostering collaboration among different stakeholders in the filmmaking value chain. Moreover, the integration of Data Lakes and Ontologies supports the automatic extraction of valuable metadata and keywords from diverse sources. This automation not only expedites content searching and exploration but also ensures consistency and accuracy in data interpretation. The resultant synergy contributes to the creation of a robust foundation for innovative filmmaking practices.

In terms of competitiveness, the unified knowledge graph, coupled with automatic knowledge extraction, provides an approach to data management that not only benefits individual projects but also establishes a standardized framework that can be adopted widely across the industry. The collaborative potential of Data Lakes and Ontologies extends beyond the SCENE project, fostering a more interconnected and dynamic filmmaking ecosystem in the EU. This, in turn, enhances the industry's ability to adapt to evolving trends, leverage new technologies, and maintain a competitive edge in the global market.

Amazon Web Services (AWS), Google Cloud, and Microsoft Azure provide data storage solutions that could be utilized for film-related data. However, these are general-purpose data storage solutions and may not be tailored specifically for the complexities of filmmaking data. Major players in the global data lake market include Microsoft (US), Teradata (US), Oracle (US), Cloudera (US), AWS (US), IBM (US), Informatica (US), SAS Institute (US), Zaloni (US), Koverse (US), HPE (US), Cazena (US), Google (US), Infoworks.io (US), Snowflake (US), and Dremio (US)¹².

The table below provides an overview of key features and aspects of various data lakes. Each data lake offers unique strengths, such as Amazon S3's seamless AWS integration or Dremio's user-friendly SQL Runner interface. Security and governance are emphasized by Azure Data Lake Storage, while Cloudera Data Platform focuses on enterprise-grade features.

Table 2: Overview of key features and aspects of various data lakes.

Data Lake	Aspects and Features
Amazon S3 / Lake Formation ¹³	<ul style="list-style-type: none"> SME's and industries can store and protect any amount of data for virtually any use case. Integration Complexity: Seamless integration with AWS services, potential complexity without Glue or a metastore/catalog solution.
Google Cloud Platform / BigLake ¹⁴	<ul style="list-style-type: none"> Data Management: Google Cloud Storage (GCS) for internal cloud data, BigLake for distributed data across clouds. Governance and Integration: Dataplex integration for governance, supports Amazon S3 and Azure data lake storage Gen 2.
Starburst Data Lakehouse ¹⁵	<ul style="list-style-type: none"> Flexibility: Combines data lake flexibility with live, interactive querying of a data warehouse. Integration: with over 50 data sources, including legacy enterprise sources.
Dremio Lakehouse Platform ¹⁶	<ul style="list-style-type: none"> Query Acceleration: Sonar, an Apache Arrow-based query engine, for accelerated query performance. User Interface: Features like SQL Runner, SQL Profiler, and Data Map for user-friendly query and analysis.

Azure Data Lake Storage ¹⁷	<ul style="list-style-type: none"> • Security Focus: Enterprise-grade security, granular access control policies, auditing capabilities. • Networking: Supports Azure Private Link for secure and private data lake access.
Cloudera Platform ¹⁸	<ul style="list-style-type: none"> • Security and Governance: Focus on enterprise-grade security, governance, and compliance features. • Deployment Complexity: Cloudera broad range of technologies may pose challenges in management.
Teradata VantageCloud ¹⁹	<ul style="list-style-type: none"> • Unified Access Layer: Unified data access layer for querying across different sources. • Analytics Capabilities: Analytics support with advanced SQL, machine learning, and graph analytics.
Oracle Cloud Infrastructure ²⁰	<ul style="list-style-type: none"> • Data Format Support: Supports structured, semi-structured, and unstructured data formats. • Integration and Vendor Lock-in: Consideration of potential vendor lock-in and pricing challenges.
Vertica Unified Analytics Platform ²¹	<ul style="list-style-type: none"> • High-performance Analytics: Columnar storage architecture for efficient querying. • Deployment Flexibility: Hybrid deployment model supporting on-premises, cloud, and multi-cloud environments.

In conclusion, the integration of data lakes and ontologies is pivotal in reshaping the landscape of data management within the filmmaking industry. Data lakes, serving as extensive storage hubs, and ontologies, providing structured frameworks for knowledge representation, collectively address the industry's growing demand for innovative solutions in handling vast and diverse datasets. The trend in the filmmaking sector is unmistakably shifting towards comprehensive data integration, emphasizing the importance of unified knowledge graphs for efficient collaboration and information exchange across various production stages.

4.2.1.2 Intelligent Media Asset Management Solutions:

A system for managing production assets is specifically crafted to oversee production workflows, monitor the individuals interacting with each asset, and track the way they engage with it. This is particularly prevalent in digital media production scenarios characterized by dynamic changes in assets, as observed in the realms of films, video games, or animation. The trend in adopting Media Asset Management (MAM) solutions is driven by the industry's increasing reliance on digital assets, including multimedia content, scripts, and other crucial elements of film production²². As the volume and complexity of digital assets grow, efficient organization, retrieval, and management become paramount. Media Asset Management solutions offer centralized repositories, like the ones provided by Widen Collective and Adobe Experience Manager, enabling seamless collaboration, streamlined workflows, and enhanced accessibility to a vast array of digital content. The SCENE project acknowledges the transformative potential of Media Asset Management solutions in handling the diverse and voluminous data generated within the film production process, providing a robust foundation for efficient content management, search, and monetization.

The adoption of Media Asset Management (MAM) systems, such as Widen Collective, Canto, Adobe Experience Manager, MediaValet, Extensis Portfolio, and WoodWing Elvis DAM, significantly contributes to the competitiveness and efficiency of the EU filmmaking industry. These MAM solutions play an important role in revolutionizing the management of digital assets throughout the filmmaking process, addressing critical needs across various stages of production.

One of the primary contributions of MAM systems is the centralization and organization of vast amounts of digital content. In an era where digital filmmaking generates a substantial volume of assets, MAMs provide



a structured and accessible repository, ensuring that filmmakers can easily locate, manage, and share their assets. This centralized approach enhances collaboration among different stakeholders, streamlining workflows and reducing the time and effort required to access relevant content. Moreover, MAMs facilitate seamless integration with other tools and platforms used in the filmmaking ecosystem. These integrations enhance the interoperability of various systems, such as editing software, content creation tools, and distribution platforms. As a result, filmmakers can create a more interconnected and streamlined production pipeline, promoting efficient content creation and distribution.

The incorporation of artificial intelligence (AI) features within MAM systems further amplifies their impact on the filmmaking industry. AI capabilities, such as auto-tagging, visual search, and workflow automation, contribute to accelerating the content creation process. Filmmakers can leverage AI-driven enhancements for tasks like video editing, metadata tagging, and even generating alternative text, leading to increased productivity and creative innovation. Additionally, MAM systems provide valuable analytics and reporting functionalities, offering insights into asset usage, performance, and audience engagement. These analytics empower filmmakers to make data-driven decisions, optimize their content strategies, and better understand audience preferences, ultimately contributing to the overall competitiveness of the EU filmmaking industry in the global market.

In conclusion, the adoption of MAM systems represents a transformative step in the EU filmmaking industry, offering a comprehensive solution for managing the complexities of digital asset workflows. The centralized, AI-driven, and analytically enriched approach provided by MAMs contributes to enhanced collaboration, efficiency, and competitiveness, positioning the industry to thrive in the evolving landscape of digital content creation and distribution.

Within SCENE, the Media Asset Management (MAM) plays a crucial role in enhancing the management and utilization of film-related data. Positioned as a key component, the SCENE's MAM encompasses a Content Management System that serves as a unified storage repository for all audio-visual material and relevant data generated within the project. Its core functionalities contribute significantly to enhancing efficiency, collaboration, and compliance in various phases of film production. The MAM establishes a unified knowledge graph, providing a structured framework for the representation, naming, and definition of entities, properties, and relationships within the film industry domain. This standardized approach enhances data interoperability and comprehension, fostering collaboration among different stakeholders in the filmmaking value chain. Furthermore, by integrating with open and existing data lakes, the MAM creates an expandable framework for diverse film data. This integration not only streamlines data access and retrieval but also fosters synergies among different SCENE components, unlocking new value propositions and facilitating better decision-making. The implementation of automatic knowledge extraction for metadata and keywords is a crucial functionality of the MAM. This feature facilitates intelligent content searching and exploration, making it a cornerstone for aligning and integrating data from various heterogeneous sources. At its core, the MAM empowers users to manage, classify, and monetize content while ensuring legal compliance. This capability simplifies the handling of raw multimedia data during both production and post-production phases, contributing to industry standards and regulations. The MAM's interaction with the EU Cultural Heritage 3D Modeling module enriches data lakes with 3D models, introducing new dimensions to the ontology. These models enhance the understanding of real environments and contribute significantly to the post-production stage.

Table 3: Overview of key features and aspects of various MAM solutions.

MAM solutions	Aspects and Features
Widen Collective (Acquia DAM) ²³	<ul style="list-style-type: none"> • Cloud-based platform for creative content and content hub for businesses: web publishing, quick file transfer, one-platform collaboration, content analytics, and asset rating. • Centralization of all sorts of assets: Organize and search uploaded content, including asset uploads and metadata. • Integrations with customer's workflows. • Coordination distribution across channels: Rule-based notifications alert, image and video conversions functionality. • Artificial intelligence: AI for auto-tagging, visual search, workflow chatbot, alternative text generator, and product descriptions.
Canto ²⁴	<ul style="list-style-type: none"> • Cloud-based platform for organizing media files: Centralize, organize, and share assets. • AI video enhancements. • Automatic publication of content to storefronts, sites, and platforms.
Adobe Experience Manager ²⁵	<ul style="list-style-type: none"> • Cloud-based platform for digital asset management and content creation • Scalable asset management: Build and edit content of any size, format, resolution, crop, or effect. • Locate similar assets quickly and automatically resize them for any format. • AI for fast delivery of personalized experiences. • Access and edit assets from Adobe Experience Cloud and Experience Cloud apps. • Integrations with third-party apps or MS teams. • Use 3D assets for engaging experiences like 360-product views, virtual reality (VR), and augmented reality (AR).
MediaValet ²⁶	<ul style="list-style-type: none"> • Cloud-based digital asset management. • AI tagging. • Customizable portals to showcase assets. • Content Delivery Network (CDN) links for fast loading. • Data-rich reporting functionality with dashboards and exportable reports. • Video asset management: automated video translation and transcription functionality, multilingual subtitles, video sharing, AI tagging with people, objects, text, spoken word, topics, and locations recognition. • Integration with various products and apps, including Adobe Creative Cloud, Google, AutoCAD, Dropbox, OneDrive, Shutterstock, and other.
Extensis Portfolio ²⁷	<ul style="list-style-type: none"> • Cloud-based digital asset management solution. • Single source of truth for images, videos, audio files, and documents. • Relevant metadata for organization. • Sharing capabilities with internal teams, partners, customers, and business systems. • Team utilization & activity scorecards. • Single sign-on (SSO). • Analytics reporting. • Basic and Premium subscription features: Auto-Activation powered by Suitcase Fusion, License Management, Editing/Tagging/Sharing, Adobe Creative Cloud Extension Integration, Google Fonts Integration, Team Utilization & Activity Scorecards, Single Sign-On, 100GB or 1TB Storage per user

	<ul style="list-style-type: none"> • Premium subscription additional features: Project Risk Scanning, Font Risk Assessment Reports, Auto-activation powered by Suitcase Fusion, License management, Font usage and license compliance reporting. • Adobe Creative Cloud extension integration and Google Fonts integration.
WoodWing Elvis DAM ²⁸	<ul style="list-style-type: none"> • Scalable cloud-based digital asset management system tailored for creative workflows: Content creation, Digital Asset Management, Multichannel Publishing. • Elasticsearch powered. • Application Programming Interfaces (API's) for fitting into the technology landscape. • Single sign-on. • Enterprise-grade security. • Content Management: Document Management, Information Management, Knowledge Management, Process Management, Quality Management. • Content Services: Creative Workflow Services, Digital Publishing Services, App Integrations.

4.2.1.3 Location Scouting:

Location scouting plays a crucial role in filmmaking, setting the stage for storytelling and visual aesthetics. The trend in utilizing digital platforms for location scouting, exemplified by tools like Scouty, LocationHub, and Set Scouter, signifies a shift towards more efficient and comprehensive methods of finding and managing film-ready spaces. These platforms provide multimedia content, including photos, videos, and regional information, allowing filmmakers to explore and select locations remotely. The SCENE project acknowledges the importance of location scouting in creating captivating narratives and sees the integration of these tools to enhance the efficiency of the filmmaking process. By facilitating the discovery and management of diverse and suitable locations, the project aims to contribute to the creative and logistical aspects of filmmaking, aligning with the broader trend of leveraging digital tools for improved efficiency and flexibility in production.

The Location Scouting tools contribute substantially to enhancing the competitiveness of the EU filmmaking industry by addressing critical aspects of the pre-production phase. More specifically, these tools provide the means for comprehensive location scouting, efficient location management and accessibility to a global network of locations for producers and filmmakers. In addition, they contribute to the economic development of a region by attracting film production activities and promoting local landscapes or cultural landmarks.

Exemplified platforms like Scouty, LocationHub, Set Scouter, and others, offer a comprehensive solution for scouting suitable filming locations. By providing multimedia content, including photos, videos, and relevant regional information, these tools empower filmmakers to make informed decisions about the locations that best fit their creative vision. International networks like NEEDaFIXER and the Arizona Commerce Authority (ACA) play a crucial role in connecting filmmakers with a diverse range of locations worldwide. This global accessibility allows filmmakers to explore and choose from a rich variety of landscapes, contributing to the EU filmmaking industry's global reach and competitiveness. Tools such as UK Film Location and the Lower Austrian Film Commission (LAFC) operate as online databases, streamlining the management, promotion, and rental of locations. By offering logistical support and information, these tools enhance the efficiency of location-related processes, supporting filmmakers in finding ideal settings for their projects. The Arizona Commerce Authority (ACA) additionally contributes to the economic development of the state by attracting film production activities. Its focus on the triptych principle "Recruit - Develop - Create" creates a favorable business environment in Arizona, attracting investment and fostering a thriving film industry. Finally, platforms like the UK Film Location actively promote local landscapes, historic towns, picturesque villages, and architectural landmarks. By showcasing diverse regional offerings, these tools contribute to the

attractiveness of EU locations for filmmakers, potentially boosting regional economies and attracting international productions.

In summary, the Location Scouting tools significantly contribute to the competitiveness of the EU filmmaking industry by simplifying and enriching the process of finding and managing diverse filming locations. Their global reach, efficient management features, and strategic economic impact position the EU as a favorable and competitive destination for filmmakers, fostering growth and collaboration in the industry.

SCENE's Location Scouting Tool contributes by providing filmmakers with an innovative and efficient solution for discovering diverse and suitable shooting locations. The tool's integration of deep learning algorithms enhances the accuracy and speed of metadata extraction, streamlining the location scouting process. Interfaces for both filmmakers and location managers promote collaboration and communication, fostering a dynamic ecosystem for location scouting in the EU filmmaking industry.

Table 4: Overview of key features and aspects of various location scouting platforms.

Location scouting platforms	Aspects and Features
Scouty ²⁹	<ul style="list-style-type: none"> Advanced metadata extraction. Real-time collaboration. Browse and book locations, equipment, and cars. Register your space as a location for photoshoots and film productions.
LocationHub ³⁰	<ul style="list-style-type: none"> Search, upload, and list your location.
Set Scouter ³¹	<ul style="list-style-type: none"> Search, upload, and list your location.
NEEDaFIXER ³²	<ul style="list-style-type: none"> Full in-house production services, post-production with creative editors, online capabilities, production crews, equipment rental, lighting and grip, 360-degree shoots, drone filming, post-production services, production support, production management.
UK Film Location ³³	<ul style="list-style-type: none"> Location search by geolocation and category, detailed location data view, export to PDF file format, free location registration for site owners, personalized support via phone and email customer service.
Lower Austrian Film Commission (LAFC) ³⁴	<ul style="list-style-type: none"> 5-step site registration interface, keyword site search, communication platform between venue owners and seekers, corresponding service for shooting staff, GREEN FILMING guide, limited to locations in Niederreich, Austria.
Arizona Commerce Authority ³⁵	<ul style="list-style-type: none"> Organized locations into categories, keyword and geographic criteria search, detailed presentation of locations, contact site administrator for more information, no cost for listing sites.

4.2.2 Production:

4.2.2.1 3D Modeling and Scanning for Cultural Heritage Preservation:

The technology of 3D Laser Scanning of buildings captures millions of data points by measuring the distance between the scanner and the structure's surfaces. These data points are then used to generate a 3D point cloud, creating a digital replica of the heritage structure. The integration of 3D modeling and scanning technologies in the film industry marks a significant trend, especially in cultural heritage preservation. Filmmakers are increasingly leveraging these technologies to create immersive and realistic environments, enhance visual storytelling, and contribute to the preservation of historical sites and artifacts. RealityCapture, Agisoft Metashape, and other tools facilitate the conversion of real-world elements into digital 3D models, enabling filmmakers to weave narratives that transcend traditional two-dimensional storytelling. The SCENE



project recognizes the value of these technologies in enriching the film production process. By incorporating 3D models into the ontology-formulated data lakes, the project aims to enhance the understanding of real environments and contribute to post-production stages, aligning with the broader trend in the film industry to embrace immersive and experiential storytelling.

The advent of 3D modeling and scanning technologies has brought about a transformative impact on the EU filmmaking industry, introducing novel dimensions of creativity, efficiency, and realism. These cutting-edge technologies are enhancing both the production process and the cinematic experience for audiences.

One of the significant contributions of 3D modeling and scanning technologies lies in the realm of set design and production. Filmmakers now have the capability to create intricate and lifelike 3D models of sets, props, and environments, allowing for meticulous planning and visualization before physical construction begins. This not only streamlines the production workflow but also facilitates a more cost-effective and sustainable approach to set design. The level of detail achievable through these technologies contributes to the overall visual richness and authenticity of films.

Moreover, 3D scanning technologies bring real-world elements into the digital realm with high precision. Filmmakers can capture real locations, objects, or even cultural heritage sites using advanced 3D scanning tools. This capability opens up new possibilities for storytelling, enabling filmmakers to seamlessly integrate the real world into their narratives. Whether it's recreating historical settings or incorporating unique architectural features, 3D scanning technologies offer filmmakers a powerful tool for enhancing the authenticity of their storytelling.

In the post-production phase, 3D modeling technologies contribute to visual effects (VFX) with remarkable realism. The ability to generate lifelike digital characters, creatures, or environments adds a layer of immersive storytelling. This technology enables filmmakers to push the boundaries of creativity, bringing elements to life in a way that was once limited by practical effects.

Furthermore, the EU filmmaking industry benefits from 3D modeling and scanning technologies in terms of efficiency and cost-effectiveness. The ability to rapidly scan real-world locations or create detailed digital assets reduces the need for extensive physical setups and reshoots. This not only accelerates the production timeline but also helps manage budgets more effectively, contributing to the sustainability and competitiveness of EU filmmaking on a global scale.

In summary, 3D modeling and scanning technologies have become integral components of the EU filmmaking landscape, revolutionizing how films are conceptualized, designed, and brought to life. These technologies empower filmmakers with creative freedom, streamline production processes, and elevate the overall cinematic experience, reinforcing the EU's position as a hub for innovative and compelling filmmaking.

Platforms such as RealityCapture, Agisoft Metashape, FARO Technologies, Leica Geosystems, Trimble RealWorks, Pix4D, and 3D Systems Geomagic specialize in capturing and preserving cultural heritage through advanced 3D modeling and scanning technologies. By documenting historical sites, artifacts, and environments, these tools contribute to the preservation of cultural richness, presenting filmmakers with authentic and detailed representations of real-world elements. The integration of 3D models into filmmaking, as facilitated by these tools, introduces new dimensions and possibilities to the storytelling process. By incorporating accurate 3D representations of cultural assets, filmmakers can enhance the visual appeal and historical accuracy of their productions. The utilization of 3D modeling and scanning technologies advances filmmaking techniques, enabling directors, producers, and cinematographers to explore new creative possibilities. The detailed and accurate 3D representations provided by these tools contribute to the development of visually stunning and authentic scenes, elevating the overall quality and impact of EU film productions.

The evolution of 3D modeling and scanning tools has significantly contributed to the preservation of cultural heritage, offering innovative solutions for documentation and reconstruction. The platforms mentioned in the previous paragraph stand as pillars in this domain, providing diverse features such as photogrammetry, laser scanning, point cloud processing, and drone mapping. These tools empower professionals to create virtual reality scenes, textured 3D meshes, orthographic projections, geo-referenced maps, and detailed 3D models with accuracy and efficiency. The integration of advanced technologies like LiDAR (Light Detection and Ranging), multispectral imagery processing, and real-time on-site registration showcases the commitment of these tools to meeting the complex needs of cultural heritage preservation. As custodians of the past, these tools play a crucial role in transforming timeless heritage into accessible, high-resolution 3D recordings, ensuring that cultural treasures are documented.

Table 5: Overview of key features and aspects of various 3D modelling and scanning solutions.

3D modelling and scanning solutions	Aspects and Features
RealityCapture (by Capturing Reality) ³⁶	<ul style="list-style-type: none"> • Photogrammetry and laser scanning in cultural heritage. • Unreal Engine integration. • Creation of virtual reality scenes, textured 3D meshes, orthographic projections, geo-referenced maps, digital replicas, and 3D models using photographs or laser scans, even from a phone.
Agisoft Metashape ³⁷	<ul style="list-style-type: none"> • Digital photogrammetry techniques, photogrammetric triangulation, processing various types of imagery, auto-calibration, multi-camera support, dense point cloud editing and classification. • Elaborate model editing. • Digital elevation model generation and editing. • Georeferenced orthomosaic generation • LiDAR data support. • Stereoscopic measurements. • 3D model generation and texturing. • Hierarchical tiled model generation. • 4D modeling for dynamic scenes. • 360° panorama stitching. • Multispectral imagery processing • Automatic powerlines detection • Satellite imagery processing.
FARO Technologies ³⁸	<ul style="list-style-type: none"> • Laser scanning solutions including FARO Orbis Mobile Laser Scanner, Freestyle 2 Handheld Scanner. • Software for processing and managing scan data. • Software for evaluating reality-capture data to CAD and BIM models.
Leica Geosystems ³⁹	<ul style="list-style-type: none"> • Offers laser scanning and reality capture solutions for creating precise 3D models. • Specializes in 3D laser scanning solutions for surveyors.
Trimble RealWorks ⁴⁰	<ul style="list-style-type: none"> • Point cloud processing and analysis. • Complete solution for registering, analyzing, modeling, and creating deliverables from any source. • Automated tools for registration and point cloud cleanup. • Tools and workflows designed for point cloud processing. • Creation of 3D models straight from the point cloud with export options to SketchUp and AutoCAD.

Pix4D ⁴¹	<ul style="list-style-type: none"> • Photogrammetry and drone mapping for creating detailed 3D models. • Features PIX4Dcloud for online platform mapping. • PIX4Dcatch RTK & viDoc for terrestrial 3D scanning with RTK survey-grade accuracy from mobile devices. • PIX4Dmatic for next-generation photogrammetry software. • Training courses, and resources.
3D Systems Geomagic ⁴²	<ul style="list-style-type: none"> • Software for processing 3D scan data and creating accurate models. • Offers Artec 3D scanners for heritage preservation with features like Artec Cloud for managing 3D scans and projects in a browser. • Artec Studio for 3D scanning software.

4.2.2.2 Integrated filmmaking solutions:

Integrated Filmmaking Solutions, akin to SCENE, represent a category of tools designed specifically for film production management and collaboration. Gorilla Software Scheduling 7, Dramatify, and Yamdu are examples of platforms that offer a range of features, including script breakdowns, production reports, crew management, and scheduling. These platforms cater to the complex needs of film production teams, providing centralized hubs for planning, communication, and resource management. The trend in adopting such platforms is driven by the industry's recognition of the need for streamlined and collaborative approaches to filmmaking. The SCENE project positions itself within this trend, aiming to provide a platform that integrates various tools and technologies to support the end-to-end filmmaking process. Through its platform, the project seeks to contribute to the efficiency, transparency, and collaboration within film production teams, aligning with the broader industry trend towards digitization and centralization of production workflows.

The category of Integrated Filmmaking Solutions, resembling the SCENE platform, holds immense potential for enhancing the competitiveness of the EU filmmaking industry by providing comprehensive and streamlined tools across various phases of film production.

Integrated Filmmaking Solutions offer a centralized platform that spans pre-production, production, and post-production phases. Such platforms provide features such as provide features such as script breakdowns, shooting scheduling, cast and crew management, task assignments, and more. By consolidating these functions into a single interface, EU filmmakers can significantly enhance the efficiency of their production workflows. This efficiency is crucial in meeting tight deadlines and optimizing resource utilization.

Furthermore, these solutions facilitate seamless collaboration and communication among different stakeholders involved in film production. Features like messaging systems, real-time updates, and integration with video editing software (as provided by StudioBinder) contribute to a more connected and coordinated filmmaking process. Improved communication is vital for ensuring that everyone involved in the project is on the same page, leading to a smoother production experience.

Integrated Filmmaking Solutions also address resource management and budgeting aspects. For instance, Dramatify offers film budgeting tools, and Gorilla Software Scheduling 7 allows for the efficient management of resources, including cast and crew. These features contribute to better financial planning and resource allocation, enhancing the overall competitiveness of EU films by ensuring cost-effective production.

The adaptability and flexibility of these integrated solutions cater to the diverse needs of filmmakers, whether they are working on feature films, TV shows, or commercials. The ability to handle complex productions with multiple crews and shooting locations, as seen in Gorilla Software Scheduling 7, makes these platforms versatile and well-suited for the evolving landscape of EU filmmaking.

In summary, the Integrated Filmmaking Solutions, resembling the SCENE platform, significantly contribute to the competitiveness of the EU filmmaking industry. By improving efficiency, fostering collaboration, addressing resource management, and offering adaptability, these platforms empower EU filmmakers to produce high-quality content in a cost-effective and timely manner.

Table 6: Overview of key features and aspects of various Integrated filmmaking solutions.

Integrated filmmaking solutions	Aspects and Features
Gorilla Software Scheduling ⁷⁴³	<ul style="list-style-type: none"> • Project management. • Scheduling interface. • Budgeting tools. • Reporting features. • Union labor rate guide. • Script breakdowns. • StoryO⁴⁴ integration.
Dramatify ⁴⁵	<ul style="list-style-type: none"> • Script breakdowns and stripboards. • Production reports. • Payroll tools. • Location management. • Collaboration tools. • Rundowns, cue cards, drama screenplays and story shelf. • Script breakdown. • Scheduling and cast management. • Scene item management • Set handling, wardrobe, makeup & hair app. • Daily production reports.
Yamdu ⁴⁶	<ul style="list-style-type: none"> • Pre-production tools. • Task assignments, announcements and crew management. • Script import and breakdown. • Production calendar and Gantt planning. • AV script, shot lists and shooting scheduling. • Cast and crew management.
Studio Binder ⁴⁷	<ul style="list-style-type: none"> • Storyboarding. • Shot lists and shooting schedules. • Collaboration tools. • Script breakdowns. • Production calendar. • File management and contact lists.
Celtx ⁴⁸	<ul style="list-style-type: none"> • Industry-standard script editor. • Supports creation of storyboards. • Index cards can be integrated with the shooting script. • In-line script breakdowns. • Organized project catalog. • Industry-level budget planning templates. • Export documents to work offline.
Filmstage ⁴⁹	<ul style="list-style-type: none"> • Film and TV production management software powered by AI. • Automatic script breakdown with up to 86% accuracy rate using AI. • Automatic script breakdown with the flexibility of manual editing.



- Customizable and easy to use, allowing users to find, add, change, or remove any tag or category.
- Users can choose colors for tags, highlight elements, and add comments on scenes.
- Easy semi-automatic scheduling with industry-standard functionalities.
- Users can specify locations, estimate prep and shooting time, drag and drop scene stripes to reorder, and auto-order scenes by various criteria.
- Real location tags from Google maps.
- Supports export to Movie Magic, Spreadsheets, PDF, and more.
- Script summary reports.
- Supports scripts in pdf and fdx formats.
- Partnerships with PGGB and Crafty Apes.
- Part of the Nvidia Inception program.
- Offers licenses for individual and corporate needs.

The chosen tools above, were selected to investigate the tool landscape of SCENE due to their comprehensive offerings that align with various phases of the filmmaking process. Each competitor provides essential functionalities such as script breakdowns, scheduling, collaboration tools, and production reports, demonstrating a commitment to facilitating efficient filmmaking workflows. The inclusion of AI-powered features in Filmustage reflects the evolving trend of incorporating advanced technologies in the industry. Additionally, the competitors' adherence to industry standards, partnerships with key organizations, and support for common formats underscore their significance in the filmmaking technology landscape.

While the chosen tools offer various tools and functionalities related to different aspects of filmmaking, it's essential to acknowledge that SCENE appears to have unique features and a comprehensive approach that sets it apart. SCENE incorporates cutting-edge technologies such as blockchain for Intellectual Property Rights (IPR) protection, a Content Management System (Media-Asset-Manager), and the integration of semantic Knowledge Graphs for efficient data management. The inclusion of modules like Location Scouting, Audience Building, and AI-based Audience Preferences Scouting further distinguishes SCENE by addressing pre-production challenges and audience engagement in innovative ways. SCENE's combination of technologies, services, and its focus on the entire filmmaking process with an emphasis on data management and audience interaction appears distinctive.

4.2.3 Post-production:

4.2.3.1 *Content distribution recommenders and film recommendation systems:*

As the digital landscape expands, content distribution recommenders and film recommendation systems have become integral for guiding viewers through a vast array of content. Streaming platforms like Netflix, Amazon Prime Video, and YouTube utilize sophisticated algorithms to recommend content based on user preferences, viewing history, and other contextual factors. This trend aligns with the growing need for personalized and curated content experiences. These technologies help users generate insights through the data collected from their customers' choices, preferences, and habits. The SCENE project acknowledges the importance of content recommendation systems in facilitating the discovery of films within its platform. By leveraging these technologies, the project aims to enhance user engagement, improve content discoverability, and contribute to the evolving landscape of personalized content consumption in the film industry.

The category of Content Distribution Recommenders and Film Recommendation Systems plays a crucial role in enhancing the competitiveness of the EU filmmaking industry, particularly in the distribution and post-production phases.

Platforms like Netflix, Amazon Prime Video, Hulu, Disney+, YouTube, Vimeo, Twitch, Tubi, Crave, and Shudder leverage advanced recommendation algorithms to tailor content distribution to individual user preferences. This personalized approach ensures that EU films reach their target audiences effectively, increasing viewer engagement and satisfaction. The trend of using recommendation systems aligns with the industry's focus on delivering content that resonates with diverse viewer interests.

Film recommendation systems contribute to the optimization of the viewer experience by suggesting relevant and engaging content. These systems analyze user preferences, viewing history, and demographic information to offer curated content lists. This not only keeps audiences entertained but also promotes the discovery of EU films, supporting the industry's goal of expanding its reach both regionally and globally.

Furthermore, recommendation systems of major platforms enhance market visibility. The algorithms consider various factors, including genre, director, and viewer ratings, to recommend EU films to a broader audience. This increased visibility leads to higher chances of revenue generation through streaming, rentals, or purchases, contributing to the economic sustainability of the EU filmmaking industry.

Content distribution recommenders and film recommendation systems play a vital role in promoting the diversity of EU films. By ensuring that a wide array of films from different genres and cultural backgrounds are recommended, these systems contribute to the rich tapestry of content available to viewers.

In summary, the integration of Content Distribution Recommenders and Film Recommendation Systems significantly enhances the competitiveness of the EU filmmaking industry by optimizing content distribution, improving viewer experience, increasing market visibility, and promoting film diversity. This trend aligns with the industry's evolution towards data-driven strategies, ensuring that EU films are not only produced with high-quality standards but also strategically positioned to thrive in the global digital landscape.

Table 7: Overview of key features and aspects of various Content distribution recommenders and film recommendation systems.

Content distribution recommenders and film recommendation systems	Aspects and Features
Adobe Target (Adobe's recommendation system) ⁵⁰	<ul style="list-style-type: none"> Personalized content suggestions to users based on their preferences and behavior. Integration with Adobe's Experience Cloud. Utilizes a shared customer profile to deliver a consistent and personalized experience across the entire customer journey. Provides a data-driven approach to identify the most effective combinations that enhance user engagement. Employs artificial intelligence (AI) and machine learning, powered by Adobe Sensei, to automate and scale personalization efforts
Amazon Personalize (Amazon Web Services, AWS Inc.) ⁵¹	<ul style="list-style-type: none"> Machine learning service enabling personalized and non-personalized recommendations. Users are able curate recommendations. Customize movie and show recommendations for unauthenticated users. Generate personalized recommendations for users based on their preferences and behavior. Features for tracking user engagement. Cross-brand engagement by tailoring promotions and recommendations across various digital properties.

	<ul style="list-style-type: none"> • Supports the creation of control groups for experimentation, comparing the performance of personalized promotions against a randomized control group.
Vertex AI (Google LLC) ⁵²	<ul style="list-style-type: none"> • Personalized product and content recommendations. • Utilizes machine learning algorithms to enhance user experience and drive engagement. • Real-time predictions to audiences around the world. • Track watch time and user retention. • Configuration options that customize for specific needs. • Supports Video, news, article, music, and podcast recommendations.
IBM Watson (International Business Machines Corporation) ⁵³	<ul style="list-style-type: none"> • An AI-powered intelligent platform for document understanding and content analysis. • Uses Natural Language Processing (NLP) and natural language understanding to automate information discovery and insights generation. • Allows businesses to leverage data science tools.
Azure Personalizer (Microsoft Corporation) ⁵⁴	<ul style="list-style-type: none"> • Utilize reinforcement learning-based capabilities to enhance user experiences, boost conversion rates, and improve engagement. • Monitor and adjust the learning loop. • Easily inspect prediction accuracy and optimize as needed. • Works with any form of data, allowing for customization based on specific business requirements. • Gain insights into user engagement to inform optimization strategies and decision-making.

4.2.4 Throughout the Filmmaking Process:

4.2.4.1 Blockchain-based IPR and NFT Platforms:

Blockchain technology, along with the rise of Non-Fungible Tokens (NFTs), is reshaping how intellectual property rights are managed and monetized in the filmmaking industry. The trend in adopting blockchain-based solutions and NFT platforms stems from the need for transparent and secure mechanisms to establish and protect ownership of digital assets. NFTs, with their unique and immutable properties, provide a novel way to represent ownership of digital content, including films, scripts, and other creative works. Platforms like NFTIFY, Mintable, and OpenSea are at the forefront of this trend, offering creators and stakeholders in the film industry new avenues for monetization and distribution. The SCENE project recognizes the potential of blockchain and NFTs in revolutionizing the management of intellectual property within the film industry, providing solutions to address longstanding challenges related to copyright, licensing, and content distribution. Through the exploration of these technologies, the project aims to contribute to the development of a sustainable and transparent ecosystem for intellectual property in filmmaking.

The Blockchain-based Intellectual Property Rights (IPR) and NFT Platforms contribute substantially to bolstering the competitiveness of the EU filmmaking industry, particularly in the realms of intellectual property management and innovative revenue models.

Blockchain-based platforms like NFTIFY, Mintable, Rarible, OpenSea, SuperRare, Flow by Dapper Labs, WAX Blockchain, and Theta Network introduce secure and transparent mechanisms for managing intellectual property rights. By leveraging blockchain's immutable ledger and smart contract functionalities, these platforms provide a decentralized and tamper-proof way to establish ownership, authenticity, and provenance of digital assets, including films and related content. This address concerns related to copyright infringement and piracy, instilling confidence in content creators and investors.

The use of NFTs on blockchain platforms allows filmmakers to tokenize their works, turning them into unique digital assets. Each NFT represents a specific piece of content or a limited edition, creating scarcity and exclusivity. This uniqueness adds value to EU films, transforming them from traditional commodities to digital collectibles. This innovative approach not only generates new revenue streams for filmmakers but also positions EU films as exclusive and sought-after assets in the global market.

Blockchain-based platforms operate as decentralized marketplaces, enabling direct interactions between content creators and consumers. This disintermediation reduces the reliance on traditional distribution channels, allowing EU filmmakers to reach a global audience without the constraints of geographical boundaries. Furthermore, by embracing blockchain-based IPR and NFT platforms, the EU filmmaking industry empowers content creators with greater control over their works. Smart contracts embedded in blockchain transactions automate royalty payments, ensuring that creators receive fair compensation for the use of their content. This empowerment fosters a more sustainable and equitable ecosystem for filmmakers within the EU.

In conclusion, the integration of Blockchain-based IPR and NFT Platforms significantly enhances the competitiveness of the EU filmmaking industry by providing secure intellectual property management, introducing NFTs as unique assets, enabling decentralized marketplaces, and empowering content creators. This trend reflects a paradigm shift in how intellectual property is managed and monetized.

Table 8: Overview of key features and aspects of various Blockchain-based IPR and NFT Platforms.

Blockchain-based IPR and NFT Platforms	Aspects and Features
NFTIFY	<ul style="list-style-type: none"> • NFT marketplace creation. • Import existing smart contracts. • Bulk upload. • Multi-currency payments. • SEO tools, blogging and social media integration. • Dynamic campaigns and actionable insights.
Mintable	<ul style="list-style-type: none"> • NFT marketplace for creation, buying, and selling. • Blockchain support (Ethereum, Zilliqa, Immutable X). • Gasless minting and batch minting. • Printable NFTs. • Support for Trust Wallet and Rainbow wallet. • Diverse content support (musical tracks, videos, images, books, etc.).
Rarible	<ul style="list-style-type: none"> • Decentralized marketplace for NFT creation and trading. • Explore collections. • Sell NFTs. • Blockchain support (Ethereum, Polygon, Immutable X, Tezos).
OpenSea	<ul style="list-style-type: none"> • Large NFT marketplace for creating, exploring, and selling digital assets. • Blockchain support. • Popular electronic wallet compatibility.
SuperRare	<ul style="list-style-type: none"> • Focus on rare digital art NFTs. • Create collections and auctions. • Explore collections. • Sell NFTs. • Ethereum payment support.
Flow by Dapper Labs	<ul style="list-style-type: none"> • Blockchain solution for NFTs and smart contracts. • Resource-oriented smart contract language. • Built for mainstream IPs, users, and apps.

	<ul style="list-style-type: none"> • Mobile app support.
WAX Blockchain	<ul style="list-style-type: none"> • Specialized blockchain for NFTs, purpose-built for gaming. • Delegated Proof of Stake (DPoS) consensus. • Mint your own NFTs. • Manage resources. • View transactions, accounts, tokens, and prices. • Interact with EOSIO-based blockchains. • Purchase cryptocurrencies directly.
Theta Network	<ul style="list-style-type: none"> • Decentralized video delivery network. • Blockchain-enabled solution for video streaming. • High-quality streaming. • Decentralized encoding, storage, and peer-to-peer delivery. • Theta Video API infrastructure. • Collaboration on the open-source Theta blockchain.

4.2.4.2 Audience Building Tools:

The film industry is characterized by the increasing emphasis on audience engagement and the need to build and retain a dedicated viewer base. Audience building tools, such as EngageHub, SocialPulse, and CrowdPlay, reflect the trend of leveraging technology to connect with audiences in meaningful ways. These tools offer platforms for social media campaigns, real-time KPI monitoring, and gamification strategies to enhance audience interaction. The SCENE project recognizes the critical role of audience engagement in the success of film projects and aims to integrate these tools into its framework.

The Audience Building Tools play a crucial role in enhancing the competitiveness of the EU filmmaking industry by fostering audience engagement, expanding reach, and refining content strategies. Tools such as EngageHub, SocialPulse, CrowdPlay, Brandwatch Consumer Intelligence, Audiense, Dstillery, GWI, People Pattern, and Meltwater focus on audience engagement through social media campaigns, real-time KPI monitoring, and gamification strategies. These tools enable filmmakers to connect directly with their audience, gather feedback, and enhance their online presence. In an era where social media plays a pivotal role in content discovery and consumption, these tools empower filmmakers to build a dedicated and interactive fan base.

Audience Building Tools provide valuable insights into audience behavior, preferences, and demographics. By leveraging data science and analytics, these tools help filmmakers make informed decisions regarding content creation, marketing strategies, and audience targeting. Understanding the intricacies of audience sentiment and engagement allows filmmakers to tailor their content to meet the specific needs and expectations of their target demographic. Some tools, like Audiense and People Pattern, offer features related to influencer marketing. Collaborating with influencers who align with the values and interests of the target audience can significantly amplify the reach of films.

Furthermore, Audience Building Tools contribute to the creation of brand loyalty by enabling filmmakers to establish a consistent and recognizable brand identity. Through targeted campaigns, personalized interactions, and strategic use of social media, filmmakers can cultivate a community of dedicated followers. Building strong brand loyalty is essential for sustaining long-term success and competitiveness in the filmmaking landscape.

In summary, the integration of Audience Building Tools enhances the competitiveness of the EU filmmaking industry by promoting audience engagement, facilitating data-driven decision-making, leveraging influencer collaborations, and fostering brand loyalty. As the industry evolves in the digital age, the ability to connect

with and understand the audience becomes a critical factor in achieving sustained success and global recognition for EU films.

Table 9: Overview of key features and aspects of various Audience Building Tools.

Audience Tools	Building	Aspects and Features
EngageHub		<ul style="list-style-type: none"> • Social media campaigns. • Real-time KPI monitoring. • Gamification strategies. • Customer journey orchestration. • Personalized customer experience. • Actionable insights.
SocialPulse		<ul style="list-style-type: none"> • Social media campaigns and audience building. • Real-time KPI visualization. • Gamification recommendations. • Curation of topics for individuals. • Recommendations for online presence. • Gather customer feedback. • Manage brand reputation.
CrowdPlay		<ul style="list-style-type: none"> • Audience engagement platform with gamification. • Social media campaigns in sports. • Supports reward points, merch, exclusive experiences, tickets, events, social media interactions. • Cutting-edge analytics.
Brandwatch Intelligence	Consumer	<ul style="list-style-type: none"> • Comprehensive social media management, recognized industry leader, Brandwatch Audiences for people-centric insights, target individuals based on demographics, interests, professions, locations, and online engagement, insights into audience's world, unique context, custom branding, crisis management, competitor analysis, trend spotting, add-on products (Vizia data visualization, Influence for influencer marketing).
Audiense		<ul style="list-style-type: none"> • Audience insights platform, not just for influencer marketing, gain insights into audiences for various marketing purposes, social intelligence, digital intelligence, demand intelligence, uncover social consumer segments, understand audience's demand for talent, brands, and IPs.
Dstillery		<ul style="list-style-type: none"> • Audience solutions for programmatic advertising, AI technology for precise and scalable audiences, Custom AI Audiences for new client acquisition, Audience Studio for self-service audience exploration and activation, Custom Built Audiences for unique combinations, Search for Audiences with over 10,000 audience options.
GWI		<ul style="list-style-type: none"> • Audience insights provider with a panel of 18 million connected consumers, subscription-based platform, on-demand insights, 200K profiling points, global or regional focus, compare countries, data-driven decisions for marketing, testing campaigns, partnerships, or product development.
People Pattern		<ul style="list-style-type: none"> • Audience analytics platform, data science approaches, social media insights, individual-focused analysis, machine learning algorithms, topic modeling, clusters of individuals, identify influencers, discover industry trends, move beyond vanity metrics, advanced audience evaluation, targeting, and engagement.
Meltwater		<ul style="list-style-type: none"> • Media intelligence and social media monitoring platform, real-time insights, AI and machine learning algorithms, consumer insights platform,

organization by data scientists, market researchers, and consumer insights experts, context-aware data organization, move beyond basic social listening, uncover valuable consumer insights.

4.3 Trend Analysis

The digital transformation of the film industry is well underway, with emerging technologies playing a central role in reshaping content creation, distribution, and consumption. The SCENE project, with its innovative solutions, positions itself at the forefront of this evolution. This chapter delves into the major trends sweeping across the digitally-enabled film industry, how they interplay with the SCENE project's KERs, and what these trends signify for the future. To comprehend the future trajectory of the digitally-enabled film industry, it's essential to discern the most influential trends that shape its direction. Here, we analyze some of the paramount trends derived from industry and market reports, showcasing the industry's evolution and the resulting implications for SCENE.

The film industry, a dynamic and lucrative sector, has witnessed significant transformations throughout its history. Evolving from silent films to today's digital cinema, it has faced various changes, obstacles, and opportunities. This chapter provides an in-depth analysis of the film industry, shedding light on crucial trends, challenges, and opportunities within the domain.

Film Industry Overview

The global film and video market reached a value of nearly \$234.9 billion in 2020, having increased at a compound annual growth rate (CAGR) of 2.4% since 2015. The market is expected to reach \$318.2 billion by 2025, and \$410.6 billion by 2030⁵⁵. The “film and video production” market was the largest segment of the film and video market segmented by type, accounting for 63.8% of the total in 2020. Post-production services segment is expected to be the fastest growing segment in the film and video market segmented by type, going forward, at a CAGR of 8.2% during 2020-2025⁵⁵.

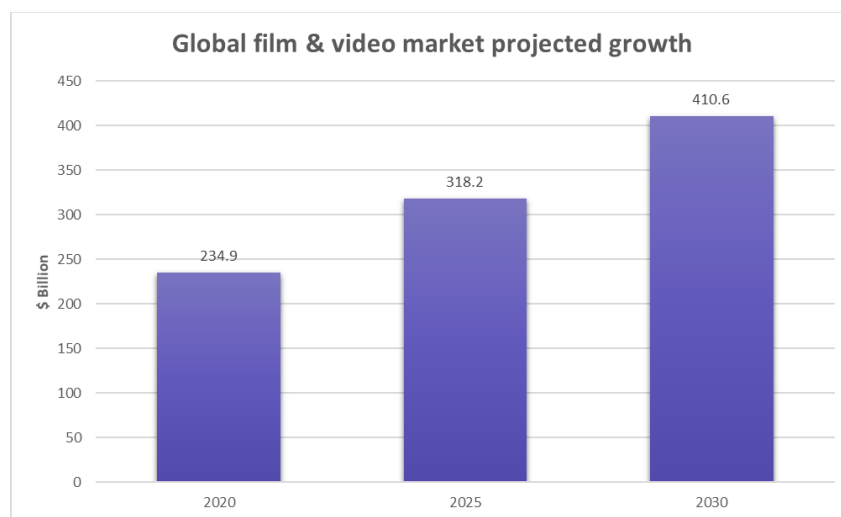


Figure 1: Global film & video market projected growth. Reference: Businesswire

The industry comprises film production, distribution, exhibition, and home entertainment. Film production involves studios, independent producers, and streaming platforms, while distribution markets and transports content to theaters, streaming services, and other outlets. Exhibition pertains to screening movies and TV shows in cinemas.

Strategies aligned with market trends in the film and video industry involve the incorporation of autonomous drones in filmmaking, investment in motion capture technologies, utilization of virtual production

techniques, Adoption of 4K and 8K camera technologies, and integration of big data technologies. Players in this industry are pursuing growth through innovative business models and strategic acquisitions of both emerging and established companies⁵⁵. Moreover, the rise in online viewing means streaming services can utilise data. By monitoring viewer analytics like demographics and preferences, platforms can make informed decisions about future programming and content genres. Emerging tools also allow geographically dispersed film crews and production teams to collaborate more effectively using platforms like cloud computing services, video conferencing software, and project management applications⁵⁶.

Constantly evolving, the film industry is shaped by technological advancements, changing consumer preferences, and emerging trends. With the proliferation of digital platforms and the advancement in AI, blockchain, and digital tools, the film industry is undergoing a transformation. These digital tools are enhancing production, distribution, and audience engagement.

Key trends include:

Streaming and On-Demand Platforms⁵⁷:

Streaming services like Netflix, Amazon Prime, Disney+, and HBO Max have revolutionized film consumption. The convenience, affordability, and original content offered by these platforms have redefined the traditional theater experience, with the pandemic further accelerating the shift towards streaming services. Netflix had a global subscriber count of 238.39 million in the second quarter of 2023^{58,59}.

Artificial Intelligence and Machine Learning^{57, 60}:

AI and machine learning are increasingly integrated into various aspects of filmmaking, including scriptwriting, casting, editing, and marketing. These technologies provide insights into audience preferences, predict box-office performance, and contribute to the generation of unique content. AI enables dynamic advertising tailored to individual viewer interests and demographics, increasing engagement and creating a more meaningful advertising experience. It also deciphers audience behavior, allowing for data-driven audience research and targeted marketing, improving the overall viewing experience. Simultaneously, it is important to highlight that AI can significantly streamline manual pre-production efforts without adversely affecting individuals involved in the industry. AI is also diminishing the time dedicated to post-production tasks, like color correction, which traditionally could consume weeks or even months to accomplish.

Reimagining movie business models in the wake of the pandemic^{61,62} :

Movie studios and distributors find themselves at a pivotal juncture, compelled to reassess time-honored business models in response to the profound impact of the COVID-19 pandemic. Two discernible trends have been accelerated: an increasing preference for home-based entertainment, and a surge in studios and media distributors establishing their direct-to-consumer streaming services. While theaters grapple with diminished attendance due to stay-at-home norms, studios face challenges such as halted productions, postponed premieres, and the need to explore direct-to-consumer avenues for income generation.

Leveraging Social Media in Film Production⁶³:

Social media is playing a crucial role in reshaping the landscape of the film industry. As the film production sector adapts to the digital age, social media platforms have emerged as influential tools, influencing aspects ranging from film promotion to audience engagement and even the creative process.

In the realm of film marketing, social media stands out as a transformative force. Today, filmmakers harness the direct connection with audiences through social platforms. This involves creating dedicated pages, crafting unique viral content, sharing compelling trailers, executing targeted ad campaigns, and fostering



vibrant communities around their films. Social media has become the driving force behind generating buzz and building anticipation for upcoming projects.

Beyond marketing, social media is democratizing the filmmaking process itself by encouraging extensive audience participation through crowdsourcing. From scriptwriting and casting to funding and marketing, audiences now have a direct stake in various stages of the creative process. This paradigm shift allows filmmakers to tap into the collective wisdom of the crowd, accessing a diverse array of ideas and resources. The result is heightened audience engagement and elevated production values, marking a significant evolution in the collaborative nature of filmmaking.

Technological Innovations Reshaping Film Production^{63,57}:

In tandem with the transformative influence of streaming services and social media, the film industry is experiencing a paradigm shift driven by technological innovations. These advancements are revolutionizing every aspect of film production, spanning shooting techniques, editing processes, and the overall viewing experience.

Filmmakers are venturing into new realms of storytelling by embracing Virtual Reality (VR) and Augmented Reality (AR). These technologies, designed to deliver immersive and engaging experiences, transport viewers into virtual environments or overlay digital elements onto the real world. The result is an unprecedented level of audience proximity to the on-screen action, suggesting a future where the boundaries between the film and its audience extend beyond the screen.

Parallel to VR and AR, significant strides in camera technology are reshaping film production dynamics. From high-definition digital cameras to the integration of AI-powered video editing tools, these advances empower filmmakers to capture visually stunning sequences while streamlining the overall production process. As these technologies evolve, filmmakers will gain an expanding toolkit to translate their creative visions into compelling visual narratives.

The impact of technology extends not only to the filming stage but also to post-production. With the advent of state-of-the-art software and AI-powered tools, filmmakers can enhance visual elements, refine soundscapes, and weave together seamless narratives. The sophistication of these tools is continually growing, opening new possibilities in post-production and expanding the horizons of what can be achieved in crafting a cinematic masterpiece.

Furthermore, Unreal Engine 5.2 revolutionizes virtual production, offering dynamic and adaptable solutions to traditional set design challenges. Filmmakers can design complex virtual sets, visualize scenes in real-time, and make last-minute changes during filming, transforming the set design process with unprecedented efficiency and flexibility.

Lighting and Scene Exploration⁶⁴:

AI-powered graphic tools revolutionize scene visualization and lighting planning. These tools not only suggest optimal lighting schemes but also recommend scenes aligned with emotional tones in the script. AI contributes to sustainable filmmaking by recommending energy-efficient lighting solutions. This advanced pre-visualization enhances planning efficiency, providing powerful tools for crafting compelling visual narratives.

In conclusion, the trend analysis highlights the dynamic shifts and significant transformations taking place in the film industry, driven by digital advancements, emerging technologies, and evolving consumer preferences. The SCENE project emerges as a pioneering force, strategically positioned to leverage the project's key exploitable results that align with these industry trends. The identified trends aligning with SCENE's KERs are at the forefront of this transformation. Streaming and on-demand platforms have



revolutionized film consumption, and SCENE's focus on AI and machine learning resonates with the industry's integration of these technologies in casting, editing, and marketing. The COVID-19 pandemic has accelerated the reimagining of business models, emphasizing a preference for home-based entertainment and direct-to-consumer streaming services. Leveraging social media in film production is a crucial trend, influencing marketing strategies, audience engagement, and even the creative process. SCENE's emphasis on audience participation and collaboration aligns seamlessly with the democratization of filmmaking through social platforms.

Technological innovations, such as VR, AR, and advancements in camera technology, are reshaping film production, offering new realms of storytelling. SCENE's incorporation of 3D models in the Unreal Engine aligns with the industry's shift towards virtual production, providing dynamic and adaptable solutions to traditional set design challenges. Moreover, AI-powered graphic tools in lighting and scene exploration contribute to sustainable filmmaking by recommending energy-efficient solutions, enhancing planning efficiency, and providing powerful tools for crafting compelling visual narratives.

4.4 Needs Evaluation of Filmmaking Value Chain Actors

This section provides an analysis of what different stakeholders within the filmmaking value chain (producers, directors, editors, distributors, etc.) are seeking from digital tools. Filmmaking, as an art and industry, comprises various actors across its value chain, from the conceptualization phase to the audience engagement segment. As the digital realm transforms this industry, it becomes imperative to understand the evolving needs of these stakeholders. This chapter delineates the needs of crucial filmmaking value chain actors in the context of the SCENE project and its KERs.

Subsequently, the needs of the main filmmaking value chain actors in the context of the SCENE project are outlined along with the SCENE's foreground assets that fulfill those needs. The stakeholder categories were also mentioned in the first release of D6.4: IPR management & ecosystem development.

1. Content creators, producers, filmmaking industries, and content creator integrators:

The key needs of this stakeholder category are related to the management of unified content, location scouting and intellectual property security. With the growth of digital assets, there's a need for tools such as the SCENE's Ontology-formulated Data Lakes and MAM to efficiently handle, classify, and monetize content. Furthermore, finding ideal shooting locations is integral. The SCENE's Location Scouting Tool addresses this requirement. Lastly, safeguarding intellectual assets is pivotal, which is addressed by SCENE's Blockchain-based IPR preservation platform.

2. Media providers, broadcasters, and distributors:

The key needs in this category of stakeholders have to do with understanding the audience dynamics and tailored distribution. Grasping audience behavior is essential, therefore tools like SCENE's AI-based Audience Preferences Scouting tool and the Audience Building tool are vital to fulfill this demand. In addition, a mechanism like SCENE's Distribution Engine and Recommender system can ensure the right content reaches the apt audience segments.

3. Artists, actors, and creative teams:

The key needs of this stakeholder category revolve around the increasing demand for digital representations and the demand for collaborative platforms. For digital artists and VFX teams, having detailed 3D models is invaluable, thus SCENE's EU Cultural Heritage 3D Modelling tool meets this requirement. Moreover, platforms, like SCENE's integrated platform, that ease collaboration and unify creative efforts across teams are crucial for this category.

4. Scientific community and research organizations:

The key needs of this particular category of stakeholders pertain to data-driven insights and the technological developments surrounding these new technologies. The need for data driven insights refers to the access to rich film-related data and analytics for research and exploration. This is offered by the Ontology-formulated Data Lakes developed in the project.

5. Technology and service providers and pilot domain companies:

The key needs of this group are linked to the integration with existing systems and the scalability of new technologies. The first need is fulfilled by the seamless integration capabilities of the SCENE tools like the MAM into existing technological infrastructures. The need for scalability is satisfied by ensuring that the SCENE innovations can scale as per the demands of the film industry.

6. Policy-making bodies, and governance:

The key needs of this category of stakeholders are centered on the clear IPR protocols and the further engagement with the industry. SCENE's Blockchain-based IPR preservation platform offers clarity on intellectual property rights, aiding in policy formulation. Furthermore, SCENE's consortium will attempt to establish a continuous dialogue with key industry players to understand the changing landscape and formulate relevant supportive policies (Task 6.3).

7. European Cultural Heritage managers, ministries and local authorities:

The key needs of this stakeholder category are intertwined with the digitization of heritage with a simultaneous promotion and protection of said heritage. SCENE's EU Cultural Heritage 3D Modelling tool helps in creating detailed digital representations of the cultural assets, while also allowing the showcasing of these heritage assets and ensuring their preservation.

8. Public audience, and consumers

The key needs of this category are centered on the increasing demand for personalized content viewing and for interactive engagement. Modern audiences seek personalized content experiences, which SCENE's recommender system provide. In addition, SCENE's Audience Building tool facilitates enhanced engagement through strategies like gamification and unique NFT offerings.

SCENE offers solutions tailored to the multifaceted needs of the filmmaking value chain. The consortium will attempt to align these solutions with the unique requirements of each stakeholder to ensure that the project not only streamlines filmmaking processes but also enhances the overall experience for all involved.

4.5 Assessment of Market Forces

The digital landscape of the filmmaking industry is subject to a dynamic interplay of market forces that significantly influence the strategies, opportunities, and challenges faced by industry participants. This section provides an assessment of these market forces, leveraging the lens of Porter's Five Forces model (see Figure 2), to illuminate the positioning of SCENE's integrated platform in the digitally enabled filmmaking landscape.

Threat of New Entrants:

Moderate to High threat: The ongoing digital transformation has reduced some barriers to entry, enabling new entrants to explore opportunities in the filmmaking industry. However, the complexity of digital filmmaking, coupled with the need for expertise in innovative technologies and established industry

networks, creates a moderate to high entry barrier. The industry's complexity and the need for specialized skills can discourage newcomers.

Bargaining Power of Buyers (Filmmakers and Studios):

Moderate to High threat: Digital technologies have empowered filmmakers and studios with a multitude of options. SCENE's integrated platform holds the potential to reduce the bargaining power of buyers by providing unique features and solutions. The platform offers unique tools, technologies, and collaborative features, providing a differentiated and valuable service.

Bargaining Power of Suppliers:

Moderate threat: Suppliers in the digitally enabled filmmaking industry wield moderate power. While the industry depends on technology providers and content creators for essential components, the presence of multiple suppliers and the potential for strategic partnerships balance this power dynamic. SCENE's collaborative approach and continuous enhancement of its platform may further strengthen this position.

Threat of Substitutes:

Low to Moderate threat: While alternative entertainment forms exist, the unique nature of filmmaking mitigates the threat of substitutes. SCENE's integrated platform, with its innovative solutions, reinforces the industry's resilience against substitutes. However, ongoing vigilance is necessary to adapt to emerging trends and technological shifts.

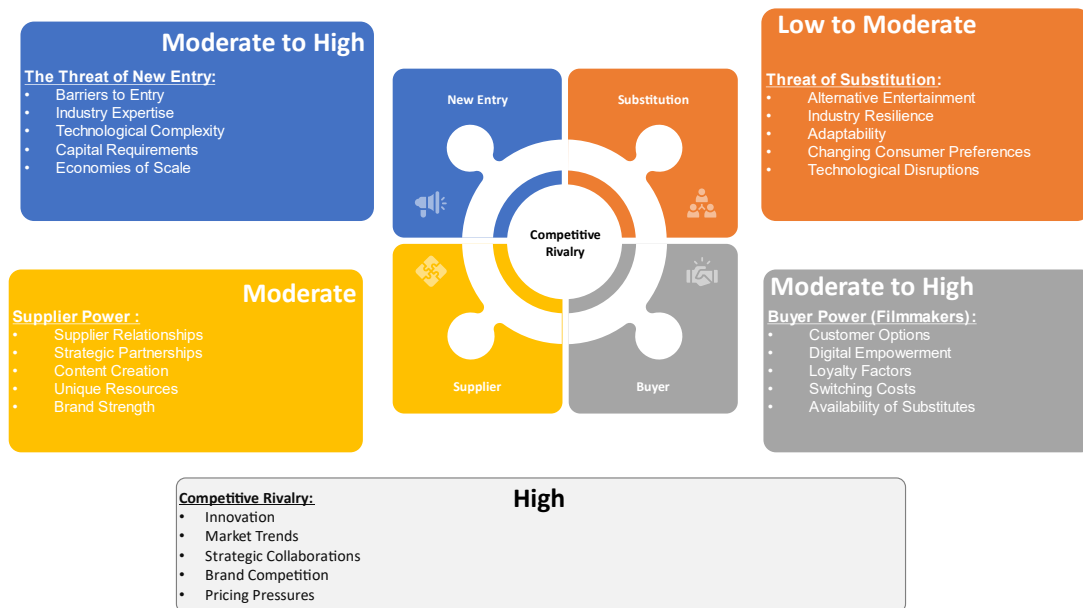


Figure 2: Porter's Five Forces model of the digitally enabled filmmaking landscape

Intensity of Competitive Rivalry:

High Intensity: The digitally enabled filmmaking industry is marked by intense competition, with numerous players vying for market share. SCENE's integrated platform competes with other innovative solutions and established players. Continuous innovation, strategic partnerships, and a keen understanding of market trends are vital to thrive in this highly competitive landscape.

In conclusion, the assessment of market forces indicates a challenging yet opportunity-rich environment for SCENE's integrated platform. By staying attuned to industry dynamics, fostering innovation, and maintaining

strategic collaborations, SCENE can navigate these market forces effectively, ensuring its sustained relevance and success in the digitally enabled filmmaking sector.

5 Lean value proposition

The Lean Value Proposition is a concept derived from Lean Startup methodology, emphasizing the importance of delivering value to customers early and continuously iterating based on feedback. In the context of SCENE and its KERs, implementing a Lean Value Proposition involves creating and refining offerings that meet customer needs, ensuring efficient resource utilization, and adapting to changing requirements.

We will follow a customer-centric approach, starting from identifying the customer needs (Chapter 4.4 of this document) and understanding the pain points and needs of our target audience. In this chapter we will clearly define the problems that each KER solves for users in the film industry. Furthermore, we will define the key performance indicators (KPIs) relevant to each KER. This may include user engagement, adoption rates, and customer satisfaction.

Following an iterative process, as the development of the KERs is evolving during the project, we will establish feedback channels for potential users. This can be obtained through surveys directed to potential users of the SCENE platform and through direct engagement with industry stakeholders from event participation. Furthermore, the outcomes from the 2-round Delphi exercise in Task 6.3 may further enhance the refining of existing features or the addition of new one, depending on the user feedback. This information guides decision-making and helps in identifying trends, preferences, and areas for improvement. The process will assist in developing detailed user personas representing our target audience. The personas development will further help in aligning the features and functionalities of our KERs with the specific needs of different user segments. The end-goal is to develop a comprehensive Minimum Viable Product (MVP) for each KER. The MVP should include the essential features that address the core needs of users.

The created user personas, the build-measure-learn feedback loop, as well as the MVP developed for each KER will be reported in the second release of D6.2 (D6.8: SCENE business models & exploitation plan.R2).

The Lean Value Proposition Canvases presented below serve as preliminary outlines that capture the essential elements of the KERs within the SCENE project. These canvases provide an initial understanding of the Customer Profile, including the Jobs, Pains, and Gains specific to each KER, as well as the corresponding Value Map components, encompassing the Gain Creators and Pain Relievers. It is important to note that these canvases are subject to iterative refinement and enhancement in subsequent versions of Deliverable D6.2 (D6.8). As the SCENE project progresses, further engagement with external experts and market actors, as outlined in Task T6.2 and Task 6.3, will contribute to the evolution of these canvases, ensuring a more comprehensive and nuanced representation of customer needs, challenges, and desired gains. The upcoming versions of D6.2 will incorporate valuable insights gathered through direct interactions with stakeholders, thereby refining and optimizing the Lean Value Proposition Canvases to better align with the dynamic landscape of the digitally-enabled film industry.

Below there is a brief explanation of each segment depicted on the canvas⁶⁵.

- Customer profile:
 - Gains – the benefits which the customer expects and needs, what would delight customers and the things which may increase likelihood of adopting a value proposition.
 - Pains – the negative experiences, emotions, and risks that the customer experiences in the process of getting the job done.
 - Customer jobs – the functional, social, and emotional tasks customers are trying to perform, problems they are trying to solve and needs they wish to satisfy.

- o Value Map:
 - o Gain creators – how the product or service creates customer gains and how it offers added value to the customer.
 - o Pain relievers – a description of exactly how the product or service alleviates customer pains.

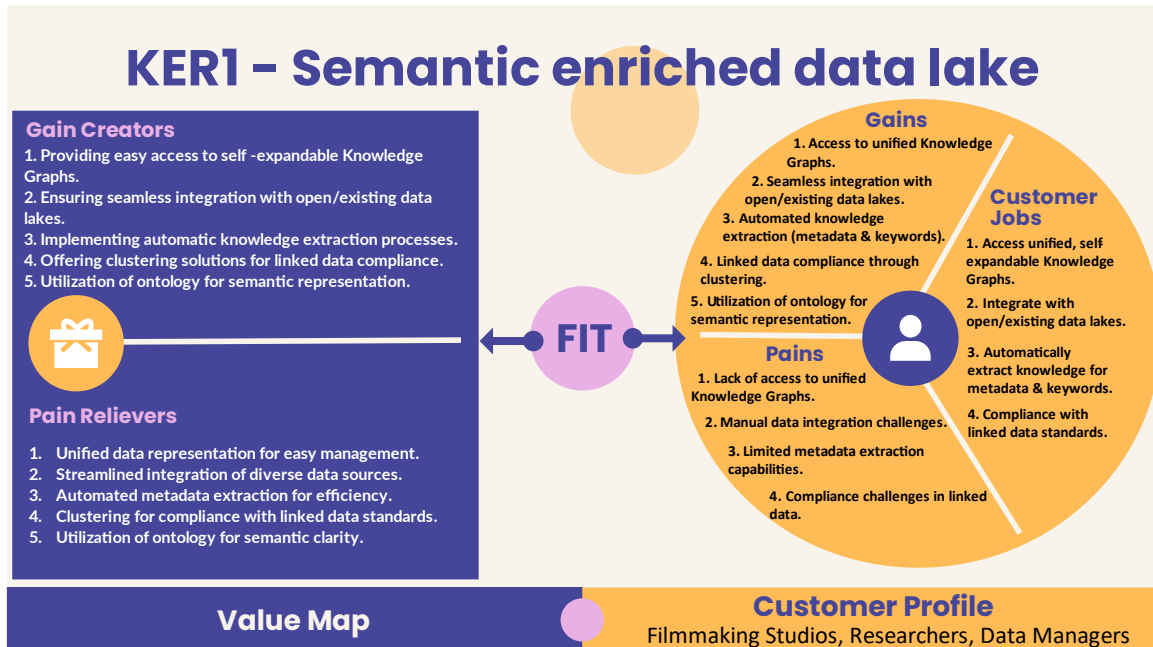


Figure 3: Lean Value Proposition Canvas of KER1 - Semantic enriched data lake.

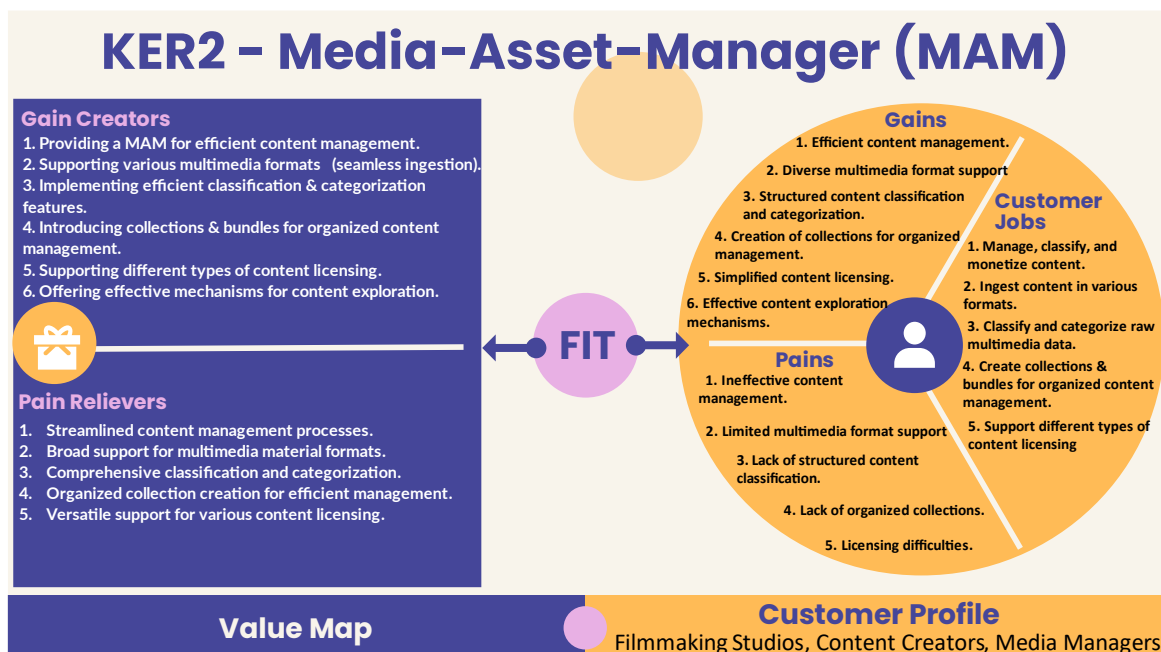


Figure 4: Lean Value Proposition Canvas of KER2 - Media Asset Manager.

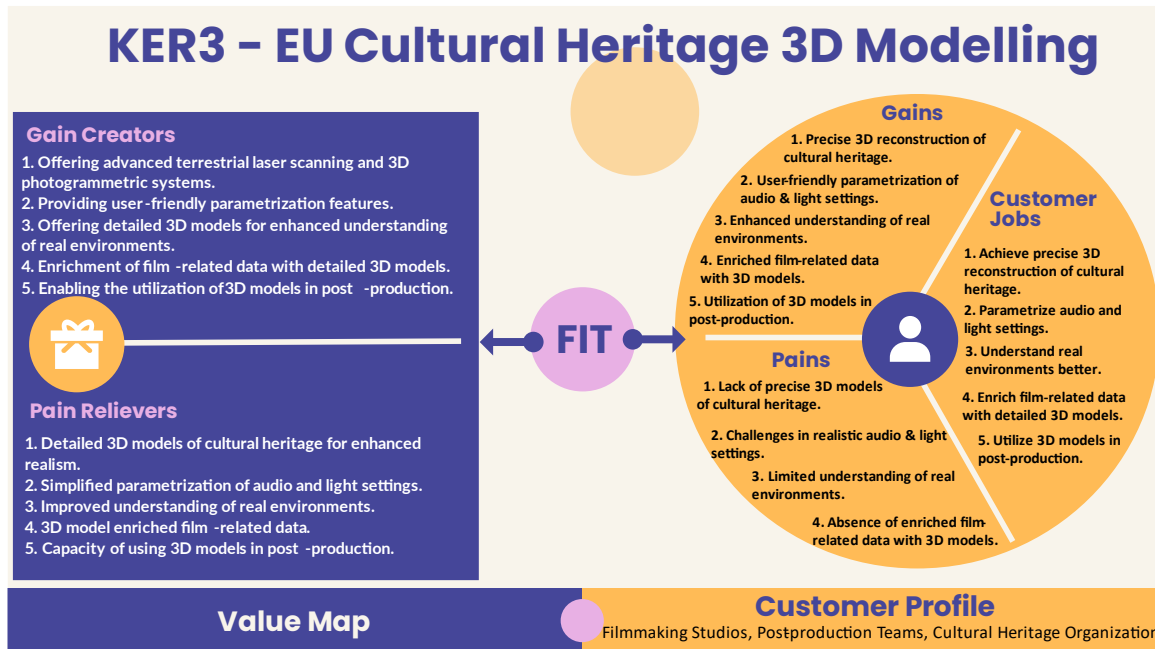


Figure 5: Lean Value Proposition Canvas of KER3 - EU Cultural Heritage 3D Modelling.

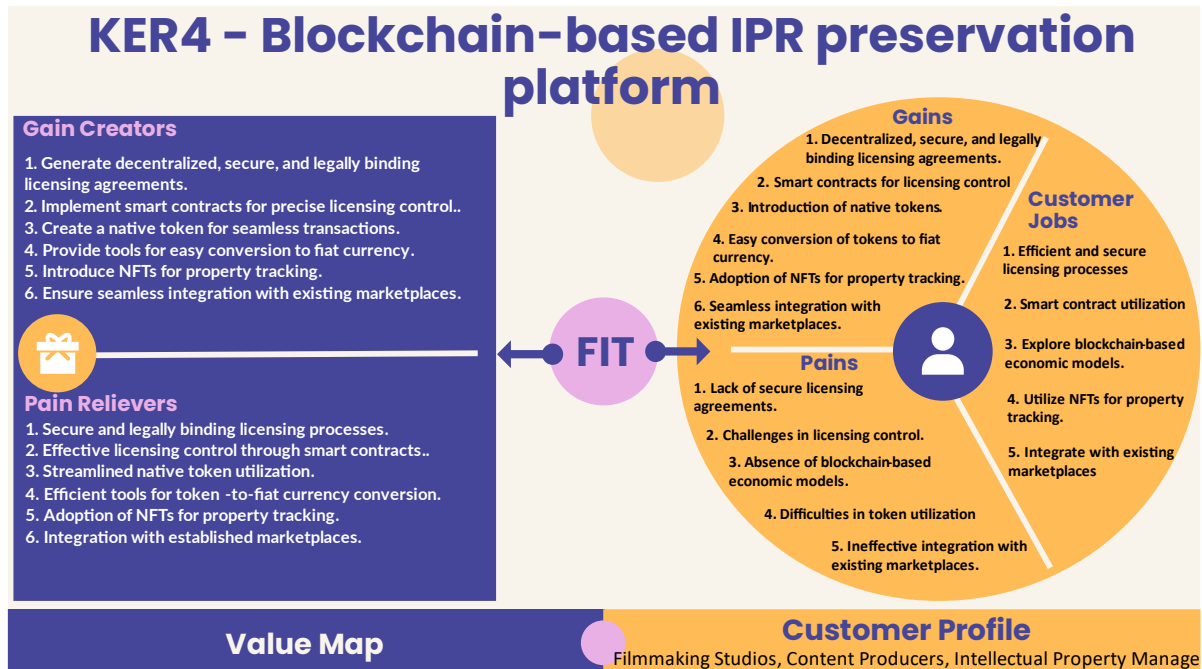


Figure 6: Lean Value Proposition Canvas of KER4 - Blockchain-based IPR preservation platform.

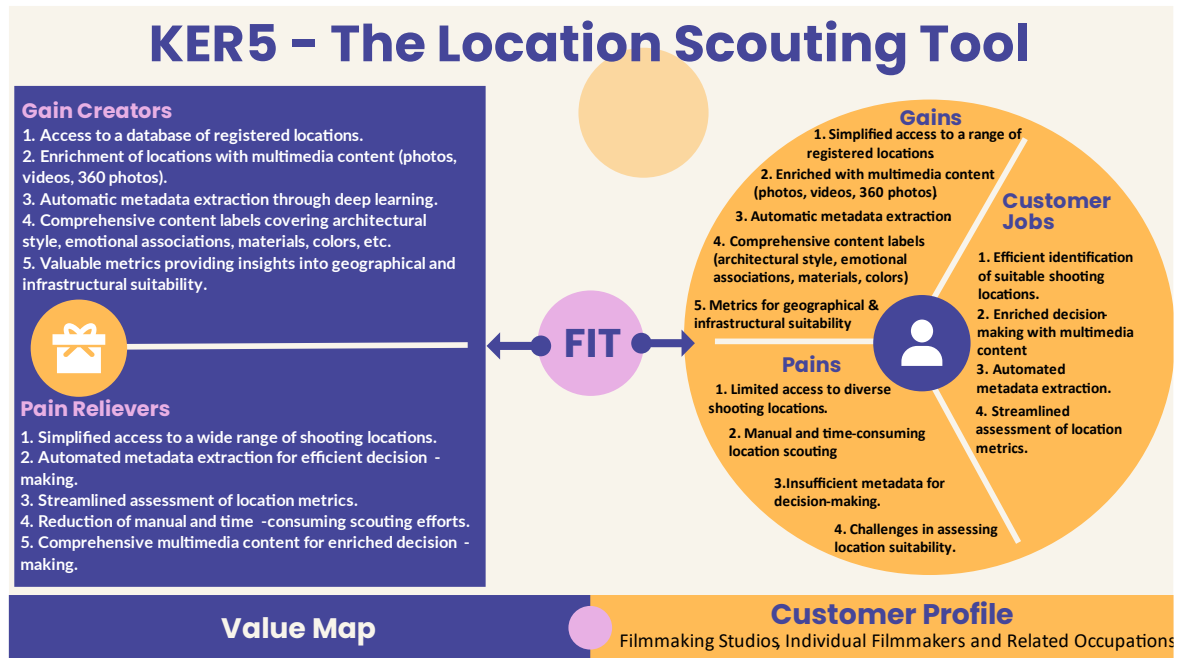


Figure 7: Lean Value Proposition Canvas of KER5 - The Location Scouting Tool.

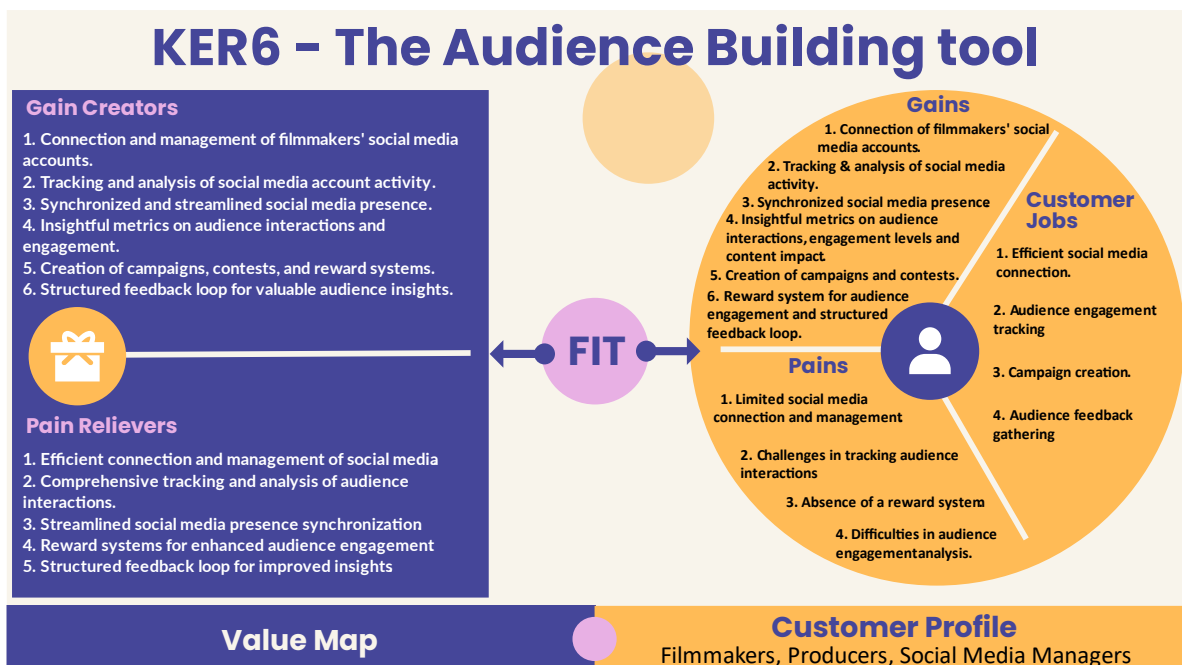


Figure 8: Lean Value Proposition Canvas of KER6 - The Audience Building tool.

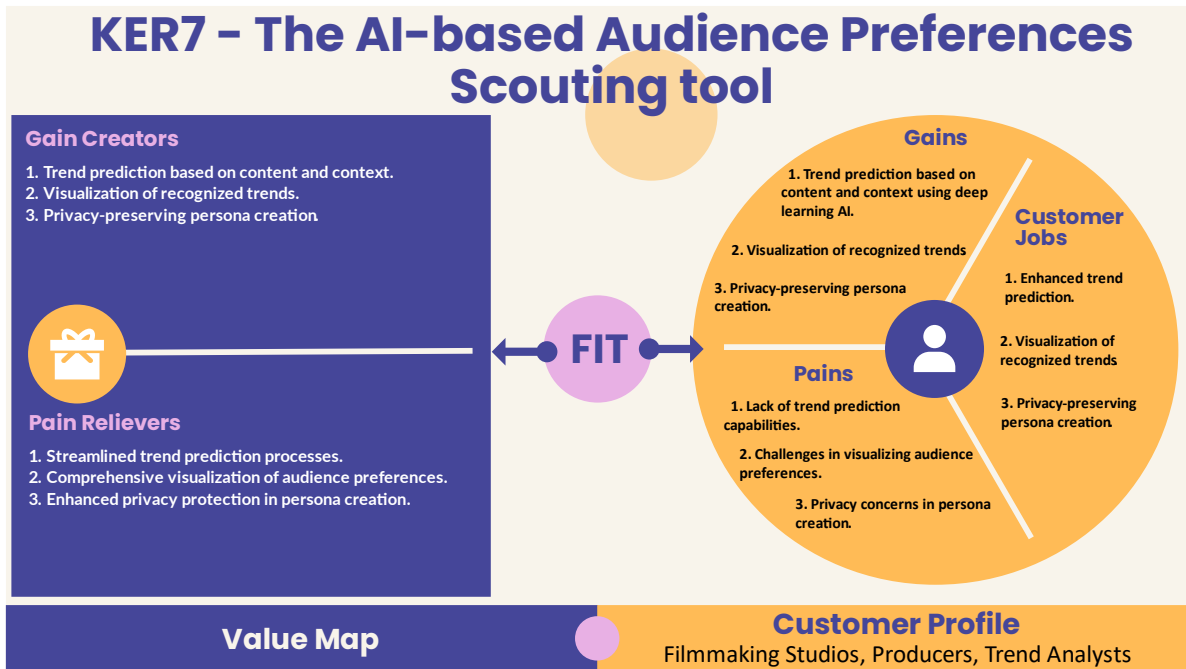


Figure 9: Lean Value Proposition Canvas of KER7 - The AI-based Audience Preferences Scouting tool.

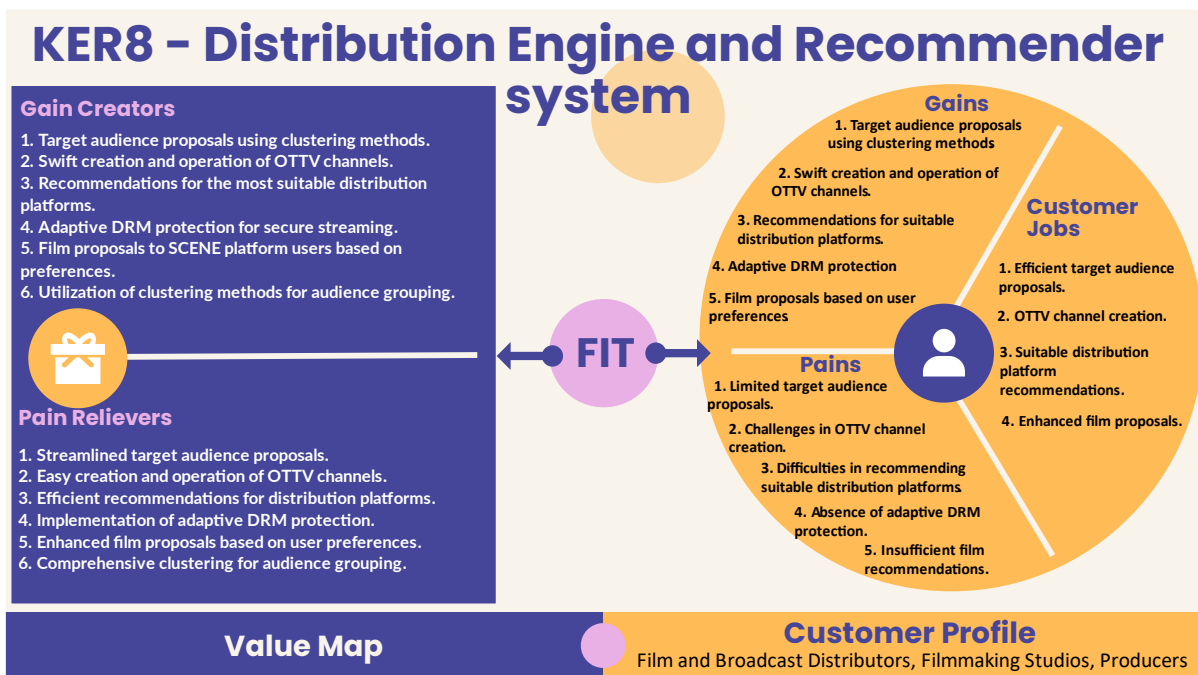


Figure 10: Lean Value Proposition Canvas of KER8 - Distribution Engine and Recommender system.

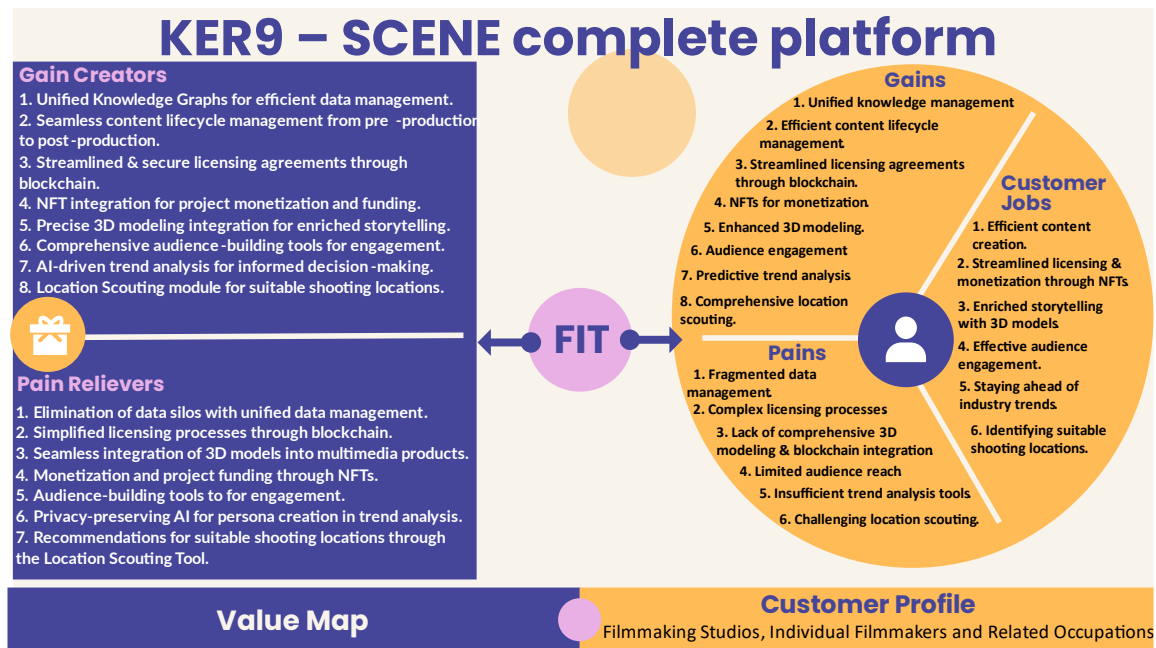


Figure 11: Lean Value Proposition Canvas of KER9 - SCENE complete platform.

The canvases above meticulously outline the customer profiles, their gains, pains, and the critical jobs they seek to accomplish within the filmmaking industry. They offer a clear and nuanced understanding of the value propositions embedded in the Ontology-formulated Data Lakes, Media-Asset-Manager (MAM), EU Cultural Heritage 3D Modelling, Blockchain-based IPR Preservation Platform, Location Scouting Tool, Audience Building Tool, AI-based Audience Preferences Scouting Tool, Distribution Engine, and Recommender System, as well as the SCENE Complete Platform.

This chapter serves as a reference point for industry stakeholders, filmmakers, distributors, and other participants in the filmmaking value chain. It is crucial to note that these canvases are preliminary in nature, representing the current understanding and alignment with customer needs. As the project progresses, these canvases will undergo iterative refinement, incorporating insights from market analysis, user feedback, and evolving industry trends. The dynamic nature of the canvases emphasizes the project's adaptability and responsiveness to the changing landscape of the digitally-enabled film industry.

Furthermore, the integrated approach of the SCENE platform, as depicted in the canvases, showcases the interconnectedness of various tools and services. The platform's holistic design, incorporating advanced technologies such as blockchain, AI, and 3D modelling, positions it as a comprehensive solution for filmmakers, providing end-to-end support from pre-production to post-production and distribution.

In essence, this chapter lays the foundation for the validation process of business models, setting the stage for the subsequent refinement and enhancement of the canvases based on real-world interactions with external experts and market actors. The convergence of innovative technologies and strategic business models within the SCENE project holds the promise of catalysing transformative changes in the European filmmaking industry.

6 Business Model Generation

The Business Model Canvas serves as a strategic management and entrepreneurial instrument employed for the purpose of articulating, creating, scrutinizing, and adapting a business model in a systematic and visual manner. This framework is utilized both for the formulation of novel business models and the documentation

of existing ones⁶⁶. The foundational elements of the business model design template, known as the Business Model Canvas, were first introduced in 2005 by Alexander Osterwalder. These elements encompass customer segments, value propositions, channels, customer relationships, revenue streams, key resources, key activities, key partnerships, and cost structure⁶⁷.

6.1 BMC model of the “Semantic enriched data lake”

The semantic enriched data lake in the SCENE project represents a paradigm shift in the organization and utilization of film-related data. The SCENE-O ontology, building the bases for dynamic and self-expandable knowledge graphs, revolutionizes the film industry's understanding of categories, properties, and relations by providing a unified framework for representation. The integration of open/existing data lakes into the SCENE platform creates an expansive ecosystem for diverse film data. The ontology facilitates automatic knowledge extraction, empowering intelligent content search and exploration. SCENE-O is aligning and integrating heterogeneous data from various sources, fostering synergies and unlocking new value.

Core functionalities:

- **Unified Knowledge Graph:**

The SCENE ontology /SCENE-O provides a semantic layer to enhance the data handled by SCENE components with additional metadata (e.g. categories according to some taxonomy, relationships among entities, etc.). The representation of such data with semantics according to an ontology allows to offer a semantic management of data through a knowledge graph.

- **Data Lake Integration:**

Integration of open/existing data lakes into the SCENE platform, creating an expandable framework for diverse film data. Merging or linking data from different SCENE components through the data lake might also create synergies and explore new added value (better search, new models, etc.)

<p>Key Partners:</p> <ul style="list-style-type: none"> ☑ Film production studios ☑ Cultural institutions ☑ Content creators ☑ Open/Existing Data Lake providers ☑ Ontology developers ☑ Standardization groups/fora 	<p>Key Activities:</p> <ul style="list-style-type: none"> ☑ SCENE-O ontology development ☑ Integration of open/existing data lakes into SCENE ☑ Implement automatic knowledge extraction <p>Key Resources:</p> <ul style="list-style-type: none"> ☑ Ontologies and Semantic Knowledge Graphs (including ingestion/ETL & processing) ☑ Data lakes Media Asset Management ☑ Film data management and ontologies expertise 	<p>Value Proposition:</p> <ul style="list-style-type: none"> ☑ Unified film-related data management ☑ Efficient content search ☑ Contextual dimensions (location & regional information) ☑ Context-enhanced content exploration ☑ Enhanced content management, classification and monetization ☑ Legal compliance assurance 	<p>Customer Relationships:</p> <ul style="list-style-type: none"> ☑ Subscription-based access ☑ Technical support ☑ Training and onboarding sessions ☑ Feedback mechanisms for platform improvement <p>Channels:</p> <ul style="list-style-type: none"> ☑ Online portal ☑ Partnerships with cultural heritage organizations ☑ Direct sales to film industry stakeholders 	<p>Customer Segments:</p> <ul style="list-style-type: none"> ☑ Film production studios ☑ Film industry professionals ☑ Independent filmmakers ☑ Content creators ☑ Cultural heritage organizations
<p>Cost Structure:</p> <ul style="list-style-type: none"> ☑ Data storage costs ☑ Data ingestion costs (ETL, ELT) ☑ Data maintenance/governance costs ☑ Ontology development and maintenance ☑ Server costs ☑ Licensing costs ☑ Marketing and promotional activities 		<p>Revenue Streams:</p> <ul style="list-style-type: none"> ☑ Subscription fees ☑ Licensing fees for third-party integration and platform usage ☑ Customization and integration services for specific film projects 		

Figure 12: BMC model of KER 1 - Semantic enriched data lake.



- **Automatic Knowledge Extraction:**

Implementation of automatic knowledge extraction for metadata and keywords, facilitating intelligent content searching and exploration. The SCENE-O might be a nuclear pillar to align and integrate the data coming from different (heterogeneous) sources.

- **Cultural Heritage 3D Modeling (KER3) integration:**

Interaction with the EU Cultural Heritage 3D Modeling module enriches data lakes with 3D models, introducing new dimensions to the ontology. These models enhance the understanding of real environments and contribute to the post-production stage.

This exploitable result contributes to a transformative approach in film industry data management. Its potential for widespread adoption extends beyond the project's scope, offering a comprehensive solution for film production, post-production and related industries. The dynamic interaction with other KERs, particularly the integration of 3D models, positions this result as a cornerstone in shaping the future landscape of film-related data management and utilization in EU.

6.2 BMC model of the “Media-Asset-Manager”

The Media-Asset-Manager (MAM) serves as a centralized hub for the effective management, classification, and monetization of multimedia content. It functions as a Content Management System (CMS), streamlining the handling of raw multimedia data during both production and post-production stages. The MAM ensures legal compliance in content management while providing tools for efficient content exploration. It enables users to create collections and bundles, supports various content licensing options, and introduces features for actionable content based on audience activities. Furthermore, it can manage information related to the films such as trailers, film crew, genre among others. This KER offers transformative solutions for film industry data management, extending its applicability beyond the SCENE project and shaping the future landscape of film-related data utilization in the EU. The MAM works together as a single unit with the Distribution Manager so that content that is available to be distributed uses the MAM as an input point for the content that is then distributed to the end users.

Core functionalities:

- **Comprehensive Content Management:**

The Media-Asset-Manager (MAM) provides users with a suite of tools to manage multimedia content. This includes intuitive features for organizing, editing, and updating content seamlessly.

- **Dynamic Content Classification:**

Users benefit from advanced capabilities to classify content dynamically. The MAM employs sophisticated algorithms and user-defined criteria to assign relevant categories and tags, enhancing the overall organization of the multimedia material.

- **Monetization Strategies Implementation:**

Beyond mere content management, the MAM serves as a strategic tool for users to implement effective monetization strategies, namely through license-based schemes based on a blockchain based platform that guarantees the rightful rewarding of content producers.

- **Versatile Content Ingestion:**

The MAM boasts the capability to ingest content in a variety of formats, ensuring flexibility for users who work with diverse multimedia sources. This adaptability streamlines the content creation process and accommodates the industry's evolving technological landscape.

- **Support for Diverse Multimedia Material:**

The MAM is designed to handle a wide array of multimedia material, accommodating different types of media, file formats, and content variations. This inclusivity ensures that users can effectively manage and manipulate diverse forms of audio-visual assets.

- **Intelligent Classification and Categorization:**

Leveraging intelligent algorithms, the MAM facilitates the automatic classification and categorization of raw multimedia data. This significantly reduces manual effort, enhances accuracy, and optimizes the overall efficiency of the content management process.

- **Creation of Collections and Bundles:**

Users can create collections and bundles of related content within the MAM. This feature supports organized content management by allowing users to group and structure multimedia assets according to project requirements or thematic relevance.

- **Support for Varied Content Licensing:**

The MAM provides a flexible framework that supports different types of content licensing. Users can easily configure and implement licensing models tailored to their specific needs.

- **Innovative Content Exploration Mechanisms:**

The MAM incorporates innovative content exploration mechanisms. Non-linear navigation, metadata-driven exploration, and other dynamic tools empower users to discover and navigate multimedia content in novel and efficient ways.

<p>Key Partners:</p> <ul style="list-style-type: none"> ✓ Film production studios ✓ Cultural institutions ✓ Content creators ✓ Open/Existing Data Lake Providers ✓ MAM development and maintenance experts ✓ IP licensing module developers 	<p>Key Activities:</p> <ul style="list-style-type: none"> ✓ MAM development and maintenance ✓ Content management & classification (taxonomies) ✓ Connection with the IP licensing module 	<p>Value Proposition:</p> <ul style="list-style-type: none"> ✓ Format agnostic content ingest ✓ Content classification & categorization ✓ Creation of collections & bundles ✓ Actionable content ✓ Support for different types of content licensing and monetization ✓ Definition & configuration of different types of audiences ✓ Inclusion of parental control features ✓ New content exploration mechanisms 	<p>Customer Relationships:</p> <ul style="list-style-type: none"> ✓ Subscription-based access ✓ Technical support ✓ Training and onboarding sessions ✓ Feedback mechanisms for platform improvement 	<p>Customer Segments:</p> <ul style="list-style-type: none"> ✓ Film production studios ✓ Independent filmmakers ✓ Film industry professionals ✓ Content creators ✓ Media agencies ✓ Cultural heritage organizations ✓ Educational Institutions for academic use
<p>Key Resources:</p> <ul style="list-style-type: none"> ✓ MAM experts ✓ Multimedia content repository ✓ Content licensing framework ✓ Audience configuration tools 			<p>Channels:</p> <ul style="list-style-type: none"> ✓ Online portal ✓ Partnerships with cultural heritage organizations ✓ Direct sales to film industry stakeholders 	
<p>Cost Structure:</p> <ul style="list-style-type: none"> ✓ Data storage costs ✓ Data maintenance/governance costs ✓ MAM development and maintenance costs ✓ Server costs ✓ Licensing costs ✓ Marketing and promotional activities 		<p>Revenue Streams:</p> <ul style="list-style-type: none"> ✓ Subscription fees ✓ Licensing fees for third-party integration and platform usage ✓ Customization and integration services for specific film projects 		

Figure 13: BMC model of KER 2 - Media-Asset-Manager.

The MAM redefines the landscape of film-related data management. With its content management features, dynamic classification capabilities, and support for diverse multimedia material, the MAM empowers users in the film industry to seamlessly organize, explore, and monetize their valuable assets. Its adaptability in content ingestion and intelligent classification, coupled with the creation of collections and support for varied content licensing, positions the MAM as an indispensable tool for the entire content lifecycle. As a KER, the MAM not only enhances the efficiency of production and post-production processes but also contributes significantly to the broader film industry's evolution toward innovative and sustainable content management practices. The MAM's synergy with other project components, such as the EU Cultural Heritage 3D Modeling module, further reinforces its pivotal role in shaping the future of multimedia content utilization in the European film landscape.

6.3 BMC model of the “EU Cultural Heritage 3D Modelling”

The EU Cultural Heritage 3D Modelling result is offering detailed 3D models generated through precise scanning processes. This result stands as a crucial module interacting with the Semantic enriched data lake and MAM within the SCENE platform architecture.

Core Functionalities:

- **Precise 3D Reconstruction:**

Utilizes terrestrial laser scanning and 3D photogrammetric systems to reconstruct cultural sites with utmost precision.

- **Parametrization of Audio and Light Settings:**

Provides the ability to parametrize audio and light settings within the 3D models, enhancing the realism of virtual environments.








 Key Partners: <ul style="list-style-type: none"> ☑ Cultural Heritage Organizations ☑ Film Production Studios ☑ Software Solutions Providers (e.g. Unreal Game Engine, Unity) ☑ 3D scanning providers ☑ VR/AR studios 	 Key Activities: <ul style="list-style-type: none"> ☑ TLS & 3D photogrammetric deployment ☑ High-resolution & HDR image-capture systems implementation ☑ Point cloud, imagery layering and combination ☑ Model refinement ☑ Deployment on Unreal Engine/Unity ☑ Licensing negotiations 	 Value Proposition: <ul style="list-style-type: none"> ☑ Precise 3D reconstruction of cultural sites ☑ Parametrization of audio and light settings ☑ Technical setup prioritization for the production stage ☑ Enrichment of Data Lake and ontology dimensions ☑ Use in post-production for multimedia product enhancement ☑ Licensing opportunities 	 Customer Relationships: <ul style="list-style-type: none"> ☑ Licensing agreements ☑ Model customization support ☑ Training and support for SW and HW utilization ☑ Feedback Mechanisms for Platform Improvement 	 Customer Segments: <ul style="list-style-type: none"> ☑ Cultural Heritage Organizations ☑ Film Production Studios ☑ Educational institutions ☑ Game developers ☑ VR/AR studios
 Cost Structure: <ul style="list-style-type: none"> ☑ Acquisition and maintenance of scanning and imaging equipment ☑ Development and maintenance of 3D modeling and rendering software ☑ Hosting and storage ☑ Licensing management ☑ Marketing and promotional activities 		 Revenue Streams: <ul style="list-style-type: none"> ☑ Licensing fees for 3D models and parametrization capabilities ☑ Subscription models for ongoing support and updates ☑ Customization and integration services for specific cultural heritage projects 		

Figure 14: BMC model of KER3 - EU Cultural Heritage 3D Modelling.

- **Technical Setup Prioritization:**



Assists the production stage by allowing a better understanding of real environments, prioritizing technical setups accordingly.

- **Enrichment of Semantic enriched data lake (KER1):**

Introduces new dimensions to the ontology within the Data Lake, enriching film-related data with detailed 3D models.

- **Post-Production Enhancement:**

3D models generated can be utilized in the post-production stage to enhance the final multimedia product.

This exploitable result addresses the complexities of cultural heritage representation and utilization in the digital realm. Its interaction with the SCENE platform, especially with the MAM, positions it as a cornerstone for film production, virtual exploration, and historical preservation. The diverse applications, from film production to virtual reality development, make it a versatile and an asset for a range of stakeholders. The potential future revenue streams are associated with licensing and subscriptions.

6.4 BMC model of the “Blockchain-based IPR preservation platform”

Project Exploitable Result Description: Blockchain-based IPR Preservation Platform

The Blockchain-based IPR Preservation Platform offers a transformative solution for IPR management in the filmmaking process. This horizontal module interacts with various services in the SCENE architecture, providing licensing control with smart contracts and ensuring the auditability of licensing for multimedia content.

Core Functionalities:

- **Decentralized and Secure Licensing Agreements using Ricardian contracts:**

Integration of Ricardian contracts with existing smart contract-based licensing agreements for the generation of decentralized, human-readable, secure, and legally binding licensing agreements between producers and consumers.

- **Integration with SCENE Services:**

Interaction with MAM for decentralised and secure licensing agreements, and with Audience Building Tool to support secure campaign crowdfunding within the SCENE platform.

- **Marketplace Integration:**

Integration with existing marketplaces for seamless license agreement creations.

- **Property Tracking with NFTs:**

Adoption of NFTs for property tracking, ensuring a rewards crowdfunding model during the campaign crowdfunding.

- **Blockchain-based Economic Model:**

Exploration and creation of a blockchain-based economic model with native tokens, facilitating the campaign crowdfunding from audience and investors.

This exploitable result not only introduces advancements in IPR preservation, but also opens avenues for novel economic models within the filmmaking industry. The platform's ability to enhance transparency, security, and accessibility in licensing agreements positions it as a key asset for film production studios,

independent filmmakers, and consumers alike. The potential revenue streams diverse from licensing fees to transaction fees.










 Key Partners: <input checked="" type="checkbox"/> Blockchain Technology Providers <input checked="" type="checkbox"/> Content Producers (Filmmakers, Studios) <input checked="" type="checkbox"/> Consumers and End -Users	 Key Activities: <input checked="" type="checkbox"/> Exploration & Application of Smart Contracts & Ricardian Contracts <input checked="" type="checkbox"/> Platform development & maintenance <input checked="" type="checkbox"/> Adoption of Non -Fungible Tokens (NFTs) for property tracking  Key Resources: <input checked="" type="checkbox"/> Blockchain infrastructure <input checked="" type="checkbox"/> Smart contract templates <input checked="" type="checkbox"/> Legal expertise <input checked="" type="checkbox"/> Development Team for platform maintenance	 Value Proposition: <input checked="" type="checkbox"/> Decentralized, Automatic, Secure, and Legally Binding Licensing Agreements <input checked="" type="checkbox"/> Utilization of Smart Contracts for Licensing Control <input checked="" type="checkbox"/> Streamlined contract processes <input checked="" type="checkbox"/> Integration with existing marketplaces for content transactions	 Customer Relationships: <input checked="" type="checkbox"/> Technical support <input checked="" type="checkbox"/> Contract customization support <input checked="" type="checkbox"/> Feedback Mechanisms for Platform Improvement  Channels: <input checked="" type="checkbox"/> Online portal <input checked="" type="checkbox"/> Marketing to Film Studios and Producers <input checked="" type="checkbox"/> Workshops & Training Sessions <input checked="" type="checkbox"/> Film festivals	 Customer Segments: <input checked="" type="checkbox"/> Film Production Studios <input checked="" type="checkbox"/> Independent Filmmakers and Content Producers <input checked="" type="checkbox"/> Consumers and End -Users <input checked="" type="checkbox"/> Blockchain Enthusiasts and Experts <input checked="" type="checkbox"/> OTT platforms (Hulu, Netflix etc.)
 Cost Structure: <input checked="" type="checkbox"/> Development and maintenance of Blockchain Platform <input checked="" type="checkbox"/> Legal and regulatory Compliance Costs <input checked="" type="checkbox"/> Marketing and promotion expenses <input checked="" type="checkbox"/> Collaboration and partnership investments <input checked="" type="checkbox"/> Blockchain transaction fees		 Revenue Streams: <input checked="" type="checkbox"/> Licensing Fees for Platform Utilization <input checked="" type="checkbox"/> Transaction Fees for Native Token Conversion <input checked="" type="checkbox"/> Customization and Integration Services for Studios <input checked="" type="checkbox"/> Consultation Fees for Legal and Regulatory Services		

Figure 15: BMC model of KER4 - Blockchain-based IPR preservation platform.

6.5 BMC model of the “Location Scouting Tool”

The Location Scouting Tool caters to the critical pre-production phase of filmmaking. Envisioned to be a knowledge base for filmmakers, this tool revolutionizes the way suitable shooting locations are identified and selected. As a part of the SCENE platform architecture, the Location Scouting Tool offers multifaceted support through a combination of deep learning technologies, multimedia content and comprehensive metadata.

The use of this tool aims to bring added value to the local communities, small cities and villages in non-popular countries. Using this tool, they will have the opportunity to provide images and multimedia, allowing filmmakers to learn about these locations and put them under their radar.

Core Functionalities:

- **Diverse Location Database:**

Access to registered locations, including public places, natural landscapes, industrial buildings, cultural heritage sites and monuments.

- **Multimedia Content and Metadata:**

Each location will be enriched with multimedia content (i.e., photos, videos, 360 photos) and metadata automatically extracted using deep learning AI models or manually inserted by location providers.

- **Deep Learning Metadata Extraction:**

Implementation of deep learning techniques for automatic extraction of metadata, generating keywords and labels for effective location search.

- **Complex Content Labels:**

Provision of complex content labels, covering architectural style, emotional associations, materials, colors, and more, enhancing the search criteria.

- **Geographical and Suitability Metrics:**

Metrics providing insights into the geographical and infrastructural suitability of locations, considering factors such as nearby services, cultural heritage sites, and industrial facilities.

- **User-Friendly Interfaces:**

Intuitive interfaces for both location managers (for site registration) and filmmakers (for location search based on metadata and geographical location).

The Location Scouting Tool not only streamlines the location scouting process, but also brings together a diverse ecosystem of filmmakers, location providers, and associated services. The potential revenue streams diverse from subscription fees to collaboration fees.










 Key Partners: <ul style="list-style-type: none"> ✓ Film Production Studios ✓ Location providers (Real Estate Agencies, City Film Offices, public bodies) ✓ Travel agencies ✓ Accommodation, equipment and catering services 	 Key Activities: <ul style="list-style-type: none"> ✓ Development & maintenance of the tool ✓ Location registration ✓ Automatic Labeling ✓ Multimedia content management ✓ Metadata extraction 	 Value Proposition: <ul style="list-style-type: none"> ✓ Access to the registered locations ✓ Efficient location scouting ✓ Context-enriched location data ✓ Multimedia Content (Photos, Videos, 360 Photos, Regional Information) ✓ Complex content labels ✓ Streamlined shooting arrangements ✓ Geographical and infrastructural suitability metrics 	 Customer Relationships: <ul style="list-style-type: none"> ✓ Subscription-based access ✓ Location recommendation support ✓ Continuous support for tool utilization ✓ Feedback mechanisms for tool improvement 	 Customer Segments: <ul style="list-style-type: none"> ✓ Film Production Studios ✓ Location providers (real estate agencies, city film offices, public bodies) ✓ Tourism and cultural authorities ✓ Service providers (Accommodation, equipment, catering etc.)
 Key Resources: <ul style="list-style-type: none"> ✓ LS Tool Infrastructure ✓ Location database ✓ Multimedia content DB ✓ Deep learning models ✓ Geographical and touristic information resources 			 Channels: <ul style="list-style-type: none"> ✓ Online portal ✓ Marketing to Film Production Studios ✓ Collaboration with location providers and agencies ✓ Workshops & Training 	
 Cost Structure: <ul style="list-style-type: none"> ✓ Development and maintenance of the tool ✓ Deep Learning technology infrastructure costs ✓ Database maintenance ✓ Multimedia content storage ✓ Marketing and promotion expenses 		 Revenue Streams: <ul style="list-style-type: none"> ✓ Subscription fees for tool access ✓ Transaction fees for location registration and booking ✓ Premium features for advanced metadata and suitability metrics ✓ Featured location listings ✓ Collaboration with tourism agencies 		

Figure 16: BMC model of KER5 - Location Scouting Tool.

6.6 BMC model of the “Audience Building tool”

The Audience Building Tool is a pre-production module within the SCENE platform, this tool harnesses the dynamic capabilities of social media and gamification techniques. This tool is designed to empower filmmakers by providing them with a comprehensive suite of features aimed at audience engagement, understanding and strategic building.

Core Functionalities:

- **Social Media Campaign Management:**

Film makers can connect and manage their social media accounts through the Audience Building mechanism. Tracking and analysis of social media account activity are presented as KPIs per film and per account. Enables

filmmakers to synchronize and streamline their social media presence through the tool. Offers insightful metrics on audience interactions, engagement levels, and the overall impact of content, aiding filmmakers in refining their strategies.

- **Gamification for Audience Engagement:**

This refers to the implementation of a gamification engine recommending optimal strategies based on continuous self-learning algorithms. Film makers can create campaigns, contests, and reward audience engagement, fostering interactions in all phases of film production. This feature provides a structured feedback loop, allowing filmmakers to gather valuable insights from their audience before, during and after production.

- **NFT Issuance for Crowdfunding:**

Producers can issue NFTs (non-fungible tokens) related to the production, such as behind-the-scenes photos and video clips. NFTs are tradeable for crowdfunding purposes, creating a new avenue for audience involvement and financial support.










 Key Partners: <ul style="list-style-type: none"> ✓ Film production studios ✓ Social media platforms ✓ Film marketing agencies ✓ Blockchain developers ✓ Funding agencies ✓ NFT marketplace platforms 	 Key Activities: <ul style="list-style-type: none"> ✓ Development and maintenance of the tool ✓ Integration with social media platforms and APIs ✓ Campaign management ✓ Monitoring and visualization of key KPIs ✓ NFT issuance  Key Resources: <ul style="list-style-type: none"> ✓ Tool Infrastructure ✓ Social media API access and integration ✓ KPI metrics ✓ Blockchain infrastructure 	 Value Proposition: <ul style="list-style-type: none"> ✓ Engaged audience building through gamification ✓ Social media campaign management ✓ Real-time campaign insights ✓ Crowdfunding through NFTs. ✓ Access to a dedicated dashboard 	 Customer Relationships: <ul style="list-style-type: none"> ✓ Subscription-based access ✓ Training and support for tool utilization ✓ Feedback Mechanisms for tool improvement  Channels: <ul style="list-style-type: none"> ✓ Online portal ✓ Marketing to film production studios ✓ Film marketing workshops ✓ Social media promotions 	 Customer Segments: <ul style="list-style-type: none"> ✓ Film production studios ✓ Film distributors ✓ Marketing agencies ✓ Audiences and fans ✓ Funding agencies and investors ✓ NFT collectors and enthusiasts
 Cost Structure: <ul style="list-style-type: none"> ✓ Development and maintenance of the tool ✓ Integration with social media platforms and APIs ✓ Implementation of gamification engine ✓ Blockchain infrastructure for NFTs ✓ Marketing and promotion expenses 		 Revenue Streams: <ul style="list-style-type: none"> ✓ Subscription Fees for tool access ✓ NFT issuance fees ✓ Partnership and Integration Fees with Funding Agencies ✓ Premium analytics 		

Figure 17: BMC model of KER6 - Audience Building tool.

- **Dedicated Dashboard:**

The tool offers access to a comprehensive dashboard providing real-time monitoring of social media campaigns and key KPIs.

- **Distribution of News and Updates:**

Amplifies the reach of filmmakers' news and updates through social media channels, ensuring widespread dissemination of information. Introduces a reward system, acknowledging and appreciating audience members for their active participation. The rewards are linked to various forms of engagement, such as likes, shares, comments, and overall activity on the film's social media accounts.

The Audience Building Tool is a catalyst for film makers, prospective audiences and funding agencies, fostering a collaborative ecosystem. Its revenue streams may range from subscription fees to transaction fees for NFT issuance. This project outcome provides film production endeavors with opportunities for engaging with audiences and securing financial support.

6.7 BMC model of the “AI-based Audience Preferences Scouting tool”

The AI-based Audience Preferences Scouting Tool (AAPS) aims at revolutionizing the way film production studios and content professionals identify trends in audience preferences. AAPS leverages deep learning AI to predict trends based on audience viewing behavior and interactions with presented content.

Core Functionalities:

- **Trend Prediction:**

AAPS employs deep learning AI to recognize and predict trends based on content and context. Trends are derived from various sources, including social media platforms, Google Trends and more.

- **Visualization of Trends:**

Content production professionals gain access to a user-friendly interface visualizing current trends in audience preferences. Trends are presented in a manner conducive to research and evaluation of potential film topics.

<p>Key Partners:</p> <ul style="list-style-type: none"> ✓ Film production studios ✓ Film streaming platforms ✓ Audience research firms ✓ Deep learning and AI technology providers 	<p>Key Activities:</p> <ul style="list-style-type: none"> ✓ Development and training of AAPS Tool ✓ Continuous improvement of deep learning models ✓ Audience behavior analysis ✓ Trend prediction ✓ Content recommendation <p>Key Resources:</p> <ul style="list-style-type: none"> ✓ Tool infrastructure ✓ Deep learning models and algorithms ✓ Audience interaction data ✓ Access to social media APIs 	<p>Value Proposition:</p> <ul style="list-style-type: none"> ✓ Prediction of trends based on audience viewing behavior ✓ Identification of current trends in audience preferences ✓ Visualization of trends ✓ Enhanced content alignment 	<p>Customer Relationships:</p> <ul style="list-style-type: none"> ✓ Training and onboarding ✓ Regular updates on trend predictions ✓ Audience insight dashboard ✓ Trend report subscriptions ✓ Feedback mechanisms for tool improvement <p>Channels:</p> <ul style="list-style-type: none"> ✓ Online portal ✓ Social media platforms ✓ Marketing to film production studios & content professionals ✓ Film production workshops 	<p>Customer Segments:</p> <ul style="list-style-type: none"> ✓ Film production studios ✓ Content production Professionals ✓ Streaming platforms
<p>Cost Structure:</p> <ul style="list-style-type: none"> ✓ Development and maintenance of the tool ✓ Continuous AI model training ✓ Data storage ✓ Marketing and promotion expenses ✓ Training and support services 		<p>Revenue Streams:</p> <ul style="list-style-type: none"> ✓ Subscription fees for tool access and trend predictions ✓ Licensing fees for integration with other platforms ✓ Customization fees for targeted research ✓ Premium features for advanced trend analysis ✓ Consulting services for trends 		

Figure 18: BMC model of KER7 - AI-based Audience Preferences Scouting tool.

- **Privacy-Preserving Persona Creation:**

To preserve viewer privacy, AAPS creates personas based on the clustering of anonymous viewer information. New viewers are associated with target group personas, fostering audience targeting without compromising privacy.

The AAPS Tool is not just a prediction engine; it is a research powerhouse for content creators and film production studios. By providing insights into audience preferences, it becomes an invaluable asset for

decision-making in content creation, ensuring that the produced content aligns with current trends. With revenue streams from subscriptions, customization fees, and licensing, AAPS contributes to the sustainability and growth of the SCENE platform. Through this innovative result, the landscape of audience-centric content creation is elevated, ensuring that the produced content resonates with the ever-evolving preferences of the audience.

6.8 BMC model of the “Distribution Engine and Recommender system”

The Distribution Engine and Recommender tools offer a lot on film production studios, media distributors, broadcasters and the audience. This exploitable result aims at enhancing the distribution and consumption of multimedia content by facilitating the personalisation of content consumption and by increasing its flexibility so that it can be used in different types of distribution scenarios.

Core Functionalities:

Distribution Engine:

- **Format-Agnostic Content Distribution:** Filmmakers gain the ability to create, set up and operate OTTV channels swiftly, supporting various video formats and encodings.
- **Platform Recommendations:** The system recommends the most suitable platforms for distributing productions, considering factors like genre, cast, director, and audience clusters.
- **Adaptive DRM Protection:** Ensures secure streaming and VoD film access, allowing instant viewing or saving collections for later.








 Key Partners: <ul style="list-style-type: none"> ✓ Film production studios ✓ Film & broadcast distributors ✓ Streaming platforms ✓ Social media platforms (for integration) ✓ Content creators ✓ AI developers 	 Key Activities: <ul style="list-style-type: none"> ✓ Development & maintenance of the tool ✓ Integration with streaming platforms & social media ✓ Film recommendation ✓ Audience profiling ✓ Content alignment ✓ Continuous enhancement of the tool 	 Value Proposition: <ul style="list-style-type: none"> ✓ Personalized content recommendations ✓ Increased viewer engagement ✓ Format-agnostic content distribution ✓ Efficient targeting for film & broadcast distributors ✓ Content optimization ✓ Quick setup of OTTV channels for filmmakers ✓ Adaptive DRM protection for streaming & VoD films 	 Customer Relationships: <ul style="list-style-type: none"> ✓ Training & onboarding ✓ Customization options for distribution strategies ✓ Collaboration opportunities for advanced features ✓ Feedback mechanisms for system improvement 	 Customer Segments: <ul style="list-style-type: none"> ✓ Film production studios ✓ Film & broadcast distributors ✓ Streaming platforms ✓ SCENE Platform Users (Audience) ✓ Social media platforms (for integration)
 Cost Structure: <ul style="list-style-type: none"> ✓ Development & maintenance of the tool ✓ Continuous improvement of the system ✓ Integration with streaming platforms & social media ✓ Marketing & promotion expenses ✓ Training & support services ✓ AI model training ✓ Content metadata management 		 Revenue Streams: <ul style="list-style-type: none"> ✓ Subscription fees for tool access ✓ Licensing fees for recommender system integration ✓ Customization fees for targeted distribution ✓ Premium features for advanced recommendations ✓ Revenue share from film and broadcast distribution ✓ Consulting fees 		

Figure 19: BMC model of KER8 - Distribution Engine and Recommender system.

Recommender System:

- **Targeted Audience Proposals:** The Distribution Engine proposes target audiences for film and broadcast distributors, leveraging clustering methods based on audience interests, demographics, and social network interactions.

- **Personalized Film Recommendations:** The Recommender System proposes films or clips to SCENE platform users (audience), considering information about the film (genre, cast, director) and user preferences (previous interests, demographics).
- **Integration with Location Scouting Tool:** Recommendations incorporate information from the Location Scouting tool, enriching the content discovery experience.
- **Data-Driven Clustering:** Utilizes clustering methods to define audience groups based on interests, previous viewing behaviour, demographics, and social network interactions.
- **Integration with AB Tool and Campaigns:** Considers information from the Audience Building (AB) tool and campaigns organized by producers to enhance the relevance of recommendations.

The Distribution Engine and Recommender System brings efficiency, personalization, and strategic targeting to the film distribution landscape. For film production studios, it opens avenues for reaching the right audience, while SCENE platform users (audience) benefit from a tailored and engaging content discovery experience. With revenue streams from subscription fees, licensing, and customization, this exploitable result contributes to the sustainable growth of the SCENE platform. Through this result, the SCENE platform evolves into a dynamic ecosystem that caters to the diverse needs of both content creators and consumers.

6.9 BMC model of the “SCENE integrated platform”

The SCENE Platform is an innovative ecosystem designed to revolutionize the film industry by seamlessly integrating advanced technologies to enhance every phase of the filmmaking process. With a focus on data management, collaboration and audience engagement, the SCENE Platform addresses key challenges faced by film production studios, post-production service providers, content creators and cultural heritage organizations.

Platform Architecture: The SCENE Platform features a robust and interconnected architecture that serves as the backbone for its suite of innovative tools. At its core is the **Semantic Knowledge Graphs (SCENE-O)**, a powerful ontology that enables a unified and comprehensive solution for managing film-related data. SCENE-O forms the cornerstone for efficient searching, exploration, and contextual understanding of film content.

Complementing SCENE-O, the platform incorporates additional modules, each playing a vital role in enhancing the overall filmmaking experience:

Media-Asset-Manager (MAM):

- Manages the complete lifecycle of multimedia content.
- Integrates open/existing data lakes into the platform.
- Supports the creation and evolution of the SCENE-O ontology.
- Implements automatic knowledge extraction for metadata and keywords.

EU Cultural Heritage 3D Modelling:

- Generates detailed 3D models of cultural sites through scanning processes.
- Parametrizes audio and light settings for realistic environments.
- Enriches the SCENE-O ontology with new dimensions.
- Enhances post-production by integrating 3D models into multimedia products.

Blockchain-Based IPR Preservation Platform:

- Facilitates decentralized, automatic, secure, and legally binding licensing agreements.
- Utilizes smart contracts for auditability and transparency.
- Introduces a native token for transactions.

Location Scouting Tool:

- Supports filmmakers in identifying suitable shooting locations.
- Provides access to a database of registered locations with multimedia content and metadata.
- Utilizes deep learning techniques for automatic metadata extraction.

Audience Building Tool:

- Leverages social media campaigns and gamification strategies for audience engagement.
- Provides real-time KPI monitoring.
- Enables the issuance of NFTs for crowdfunding purposes.

AI-Based Audience Preferences Scouting Tool:

- Predicts trends based on audience viewing behaviour and content interactions.
- Utilizes deep learning AI to recognize and predict trends.
- Preserves viewer privacy through persona creation and clustering algorithms.

Distribution Engine and Recommender System:

- Recommends films or clips to the audience based on film and user information.
- Considers information from the Audience Building Tool, Location Scouting Tool, and AI-based Audience Preferences Scouting Tool.
- Personalizes content with end-user preferences.

Together, these modules form an integrated ecosystem, leveraging advanced technologies to streamline and optimize various aspects of the filmmaking process. The interconnected nature of the architecture ensures seamless collaboration, data flow, and synergy between the different tools, ultimately redefining how film-related data is managed, processed, and utilized within the industry.

<p>Key Partners:</p> <ul style="list-style-type: none"> ☑ Film Production Studios ☑ Open/existing data lake providers ☑ Cultural institutions ☑ 3D scanning providers ☑ Location providers ☑ Touristic agencies ☑ Production service providers ☑ Technology partners (cloud, AI, SW development) ☑ Film schools and institutions ☑ Funding agencies ☑ NFT marketplace platforms ☑ Social media platforms ☑ Film streaming platforms 	<p>Key Activities:</p> <ul style="list-style-type: none"> ☑ Development, integration and maintenance of all SCENE technologies ☑ Marketing and promotion ☑ Stakeholder engagement (Partnerships, workshops, demos) 	<p>Value Proposition:</p> <ul style="list-style-type: none"> ☑ Catering the needs of all actors in the filmmaking value chain ☑ Unified film-related data management ☑ Efficient location scouting ☑ Secure and transparent IPR management ☑ Efficient collaboration tools for remote work ☑ Streamlined workflows for filmmakers ☑ Predictive analytics and audience insights ☑ High-fidelity 3D models of cultural sites ☑ Crowdfunding through NFTs. 	<p>Customer Relationships:</p> <ul style="list-style-type: none"> ☑ Dedicated technical support channels ☑ Training & onboarding sessions ☑ Webinars and workshops ☑ Newsletter subscriptions ☑ Feedback channels 	<p>Customer Segments:</p> <ul style="list-style-type: none"> ☑ Independent filmmakers, studios, media providers, Content creators, producers, broadcasters, and distributors ☑ Students and educators in film schools ☑ Film festival organizers and participants ☑ Film critics and audience for consumption-related tools ☑ Location scouts ☑ Cultural Heritage managers, ministries and local authorities
<p>Cost Structure:</p> <ul style="list-style-type: none"> ☑ Development and maintenance of the SCENE platform & tools ☑ Marketing and promotional expenses ☑ Cloud infrastructure and data storage costs (including location database & blockchain infrastructure) ☑ Further research, development and continuous innovation costs ☑ Salaries for the SCENE team and external consultants ☑ Legal IPR protection fees ☑ Other operational costs: Rent, travel, legal, etc. 		<p>Revenue Streams:</p> <ul style="list-style-type: none"> ☑ Subscription models for different toolsets and access levels ☑ Direct sales of the SCENE framework ☑ IP licensing deals (with film production studios, film schools and institutions) ☑ Partnership and advertising deals (ex. with film festivals) ☑ Partnership with industries/ companies (royalty plus fixed annual license) ☑ NFT transaction fees ☑ Premium features and advanced analytics for an added fee ☑ Public and private funding ☑ Customization and integration services for specific film projects 		

Figure 20: BMC model of KER9 - SCENE integrated platform.

7 Future Plans - Validation Process of Business Models

This chapter outlines the future plans for the validation process of business models identified through the comprehensive market analysis conducted in Task 6.2. The objective is to ensure that the proposed business models align with the needs and dynamics of the digitally-enabled film industry.

To validate and refine the identified business models, a robust methodology will be employed. This process will involve direct engagement with external experts and market actors as part of Task 6.4. Their valuable insights and feedback will be instrumental in enhancing the viability and applicability of the proposed business models. The validation process will commence with an in-depth examination of each business model proposed for SCENE's KERs. This will involve a critical evaluation of various components, including value propositions, customer segments, revenue streams, and cost structures. External experts and industry stakeholders engaged during the project will play a crucial role in the validation process. Their perspectives and domain-specific knowledge will contribute to refining the business models and ensuring their relevance in the rapidly evolving film industry landscape.

Validation is an iterative process, and feedback from stakeholders will be systematically incorporated to enhance the robustness of the business models. This cyclical approach allows for continuous refinement, ensuring that the models effectively address the unique challenges and opportunities within the digitally-enabled film industry. The validated business models will be closely aligned with SCENE's key exploitable results, ensuring a seamless integration of digital technologies into the filmmaking value chain. The refined models will contribute to the overall success of the project and its impact on the European filmmaking industry.

Building upon the validated business models, the task will culminate in the development of a comprehensive business plan. This plan will encompass detailed business and marketing strategies, along with financial projections. It will serve as a roadmap for the successful deployment of SCENE's key exploitable results.

8 Conclusions

This document provided a comprehensive exploration and analysis of the digitally-enabled film industry, emphasizing on SCENE's KERs and their potential impact on the market. The document begins with an insightful market analysis, dissecting the tool landscape, trends, needs of filmmaking value chain actors, and assessment of market forces. Each KER is then individually examined through Lean Value Proposition Canvases, providing a detailed understanding of the customers, their associated jobs, pains, gains, and the value maps illustrating how SCENE's solutions address these aspects.

The market trends identified in the film industry, such as the dominance of streaming platforms, the integration of AI, and the evolution of storytelling technologies, underscore the timeliness and relevance of SCENE's innovative solutions. The collaborative efforts of SCENE partners have resulted in the development of diverse KERs, ranging from ontology-formulated data lakes and media asset management to blockchain-based IPR preservation and audience building tools. The integrative SCENE platform stands out as a unified solution, offering a comprehensive set of features that enhance various aspects of the filmmaking process.

Furthermore, the Lean Value Proposition Canvases provide a structured visualization of the value propositions for each KER, outlining the benefits, pain alleviation, gain creation, and overall customer satisfaction that SCENE aims to deliver. These canvases act as a foundation for understanding the unique value propositions of each KER, setting the stage for further refinement and optimization in subsequent versions of D6.2. The document concludes with an anticipation of continued engagement with external experts and market actors to gather valuable insights, ensuring that SCENE's business models and strategies remain adaptive and aligned with the evolving landscape of the film industry.

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