

**Project duration in months**

6 months

**Innovation area**

Creative industries

**Research category****Selected research category**

Industrial research

**Project summary**

No feedback provided

**Project summary**

The project, named "KnoWhere," leverages the power of AI and computer vision to provide infrastructure which could help transform the way we understand and engage with physical spaces like museums and immersive experiences. Unlike existing solutions that often require intrusive wearables or cameras, KnoWhere promises seamless integration into existing environments. It aims to track user attention and emotion in real time, providing invaluable but private data points that can be used to adapt and personalise experiences. We believe this technology could significantly enhance visitor engagement and provide actionable insights for curators and designers. We intend to build and test the tracking infrastructure required to interact with steerable barrier lenticular displays. These displays allow stereoscopic light (depth perception) to be projected into the eyes of multiple observers, creating a unique and personal visual experience. The system supports productivity in creative industries introducing new and exciting modalities of narrative building, improving visitor experiences, and expanding the capacity and duration of designed educational and entertainment narratives. This new capability to personalise and constantly freshen exhibits could drive repeat visits, allowing world-class designers like our partner Immersive International to reduce redesign costs, and unlock new kinds of interaction.

**Public description**

No feedback provided

**Public description****Revolutionize Creative Spaces with KnoWhere's Attention Tracking Technology!**

Have you ever wondered how you can make museums and exhibitions more engaging? Say hello to KnoWhere, the future of visitor experiences! Using state-of-the-art AI and computer vision, we are redefining how creative spaces engage

with their audience. And the best part? No wearables or intrusive cameras are needed!

## See What's Never Been Seen Before!

Our cutting-edge technology tracks visitor attention and emotion in real time, providing actionable insights that can take your exhibition to the next level. Unlike existing solutions that require clunky hardware or violate privacy, KnoWhere offers a seamless and ethical approach to understanding your audience.

## Unlock the Future of Interactive Exhibits!

Why settle for static displays when you can offer dynamic, personalized experiences? With KnoWhere, you're not just improving space utilization; you're opening the door to a whole new world of interactive storytelling and engagement. Plus, our technology makes redesigns a thing of the past, saving you both time and money!

Don't miss out on the revolution that's setting a new standard in the creative industries. Join us in making history with KnoWhere!

## Scope

In scope 5/5

### How does your project align with the scope of this competition?

## Our Proposal

Our idea of creating a platform for creatives and museum curators to improve the quality and relevance of each visit by collecting positional, gaze, and emotional state is radically new. Other products and services available globally do not offer significant solutions and our technology stack will have to be different too: no proprietary sensors, and on-site hardware will guarantee complete anonymity and safety while allowing data collection to be fast and reliable.

## Themes

Our project is in line with the scope for this funding round. We are developing AI capabilities to create a product that will substantially increase the productivity of designers of immersive experiences and curators of museums. Furthermore, our solution promises to enhance the user experience which is a mechanism for increased returns by itself. Our meetings with industrial partners and prospective clients have shown that the demand for our technology would be substantial.

## Research Category

Our project work falls within the definition of Industrial Research. We currently have the capacity to connect with cameras in venues and extract information on

the position of users. We want to enhance our capabilities to add gaze direction and emotion tracking.

## Assessor feedback

### Assessor 1

The application seems to fit with the remit of the competition brief.

### Assessor 2

Project is in scope because it addresses productivity in the creative industries, identifies users and engages with partners.

### Assessor 3

The application meets the scope of the competition brief.

### Assessor 4

The proposal aims to use AI methods so as to obtain positional, gaze, and emotional state of visitors, e.g., of museums. As a result, improved capabilities and services can be provided.

### Assessor 5

The applicant has described an innovative technological project that complies with the set scope criteria for the competition round of funding.

## Application questions

### 1. Applicant location (not scored)

No feedback provided

#### Applicant location

QuasiScience is a London-based company. Our business address is:

1A Greenberry Street,  
London,  
NW8 7AB

### 2. Permits and licences (not scored)

No feedback provided

#### Permits and licences

Yes, we have all the necessary licences needed for the project.

### 3. Need or challenge

Average score 5.0 / 10

#### What is the business need, technological challenge, or market opportunity behind your innovation?

The primary motivation for KnоЮhere is to enable world-class exhibition spaces to offer entirely new AI-enabled narrative engines for creatives and experience designers. Expectations around hyper-personalised data and real-time interaction are changing quickly in an AI-infused world, and it will be crucial to allow designers to integrate these exciting and expected modalities into large-scale spaces like museums and exhibitions. The current market offers limited solutions that are often intrusive, limited to small and discontinuous sub-sections of space, and do not provide real-time feedback into the overall experience. The technological challenge lies in the seamless integration of AI and computer vision technologies to provide a non-intrusive yet highly effective solution. This is recently possible for what we feel to be the first time thanks to advances in camera and compute systems. We have already conducted some development work and studies that underline the viability and urgency of this need thanks to our relationship with great partners like Immersive International and Badger & Coombs.

#### Assessor feedback

##### Assessor 1

The problem, the need and the challenges are not discussed in sufficient depth. Two partners are identified. No information presented on the competitive landscape.

### **Assessor 2**

The technical challenge is clear. The business motivation is presented but lacks precision (or examples). The proposal does not avail itself of all available space to build a strong case.

### **Assessor 3**

The business motivation for the project could be evidenced further through reference to recent relevant research. The nearest state-of-the-art available could be detailed further through reference to specific technologies and provisions. Further detail on the development work and studies undertaken to date could be used to highlight the demand for specific aspects of the project from specific target customer types.

### **Assessor 4**

Making visitors, e.g., of museums, more engaged, by analysing the context of their visit has been an issue of R&D in the last decade for cultural institutions. The proposal focuses on issues that do not include concerns, e.g., position of the visitor, but it also considers analysis of their emotion and gaze, which raises concerns.

### **Assessor 5**

The need for the proposed project has been clearly described. There is a good awareness of what is currently available and how the proposed product provides significant enhancements for the holistic user experience in venues such as museums

## **4. Approach and innovation**

Average score 5.4 / 10

**What approach will you take and where will the focus of the innovation be?**

Our approach is to utilise very high-resolution machine vision cameras, high bandwidth connections to local GPU compute systems, and various machine learning tooling, to capture the following aspects of humans in the capture space:

- Location in the room (already developed internally)
- Pose (already developed internally)
- Body orientation (development in progress)
- Head gaze (within the scope of the project)
- Eye gaze (within the scope of the project)
- Emotional state (within the scope of the project)

In order to accomplish this demanding task we utilise state-of-the-art AI algorithms in conjunction with our proprietary cutting-edge computer vision techniques to capture and process data in real-time. The data is completely anonymised by design: each data processing step discards part of the data only retaining an aggregate vector that contains spatial coordinates and approximate descriptions of engagement and/or emotional state for all visible humans. This means that sensitive data is never stored because the data is captured "in transit". This allows generative AI within the designed space to engage with the attention of the visitors, without compromising on their privacy. The innovation lies in our ability to do this seamlessly without requiring visitors to wear any devices. This breakthrough is only possible in this moment thanks to breakthroughs in machine vision capture at these demanding resolutions. We think that this approach can optimise space allocation in very high footfall and throughput spaces, improve visitor engagement, drive visitor re-engagement, and reduce operational costs. Our system is designed with a strong focus on ethical AI use, ensuring data privacy and integrity.

[Application Details.pdf \(opens in a new window\)](#)

(</application/10101453/form/question/37542/forminput/103165/file/626492/download>).

## Assessor feedback

### Assessor 1

Process flow diagrams are included in the Appendix to explain the proposed innovation. Not enough effort has been put into explaining the proposed innovation in the body of the response. The scope of work has not been clearly identified.

### Assessor 2

There is a gap in the proposal between what they are trying to achieve and the backend computational approach. Both of these are clear enough, but while the proposal says that customer/users won't have to wear anything, there is no

information on how they will enjoy an immersive experience, nor how their emotional state will be determined.

### **Assessor 3**

The technical approach outlined could be more explicitly related to specific needs identified for specific target customers, audiences, or other beneficiaries. A point-by-point competitor comparison could be used to highlight specific areas of differentiation in specific use contexts that have the potential to give rise to competitive advantage. Freedom to operate could be more explicitly considered here.

### **Assessor 4**

The approach includes many problematic issues: 1\. Capturing eye & head gaze (in faces) and emotional state of visitors in museums requires that they are asked/give their permission for this; the proposal does not discuss the feasibility, i.e., if/how this is obtained. Data are anonymised (while the visitors' faces are processed! who ensures this)? . Emotion analysis requires psychological and AI models (not described) - a general pipeline with a 'sentiment' block is only included. Additionally, very high-resolution cameras, local GPU systems, ML tools are assumed to exist; how will their cost be covered by the local Museum?

### **Assessor 5**

The applicant has detailed the main innovative elements of the proposed project and described how it will address the need as stated in Q3 and also how it differentiates with existing offerings. No information has been provided in this section in relation to freedom to operate

## **5. Team and resources**

Average score 5.2 / 10

### **Who is in the project team and what are their roles?**

**Marco Ghilardi** is our project lead and software development expert for AI systems. Marco, has been developing AI models in highly competitive industries like Formula One and Aerospace. More recently, he has been supporting AI implementations in the Fashion Industry.

**John O'Hare** is our large-scale immersive systems expert and has considerable experience in high-throughput GPU systems. His connections to the media and exhibition industries have enabled us to build a strong path to market from the start of the project.

The team consists of specialists in AI, computer vision, data engineering, and project management, ensuring a comprehensive skill set for the project's multifaceted demands. We have access to high-end computing resources, necessary for the data-intensive tasks involved. Each team member has been carefully selected to ensure that the overall team has a comprehensive skill set. Furthermore, the team dynamic has been already tested: we have already worked on other successful projects in the past.

Our key external partners have also agreed to lend us their expertise on a broad number of topics and validate the project's industry relevance.

- **Immersive International** will advise us on the requirements for experience designers. Our tight partnership with Immersive International will help us achieve a product-market fit in the shortest possible time.
- **Badger and Coombs** offered to advise on the project.
- **Media City UK Technology Innovation Hub** has offered to support our research efforts and possibly to make space available for us to test our technology in the field.

[team.pdf \(opens in a new window\)](#)

(</application/10101453/form/question/37543/forminput/103171/file/626196/download>).

## Assessor feedback

### Assessor 1

Two team members have been identified. Their CVs are included in the Appendix. No recruitment needs have been identified. No organisation chart has been included.

### Assessor 2

This team of two is not likely to cover any business aspects of the project. The specifics of each person's role is not presented.

### Assessor 3

Project team biographies could be more explicitly related to specific roles and responsibilities in the project activities and work packages. Plans to obtain the necessary resources, equipment, and facilities could be detailed further here.

Further detail on the relevant track record of all the project partners could be considered here.

#### **Assessor 4**

A good team with three external partners. However, a clear collaboration with a University research group in affect and visual analysis through AI/ML methods would be beneficial.

#### **Assessor 5**

The applicant refers to a 'team' and names the roles within that team which are relevant to the delivery of the project however has only provided the details of two of the key persons. It is therefore not possible to assess the skills and experience and make a judgement on their capability to deliver or commercially exploit the described project

## **6. Market awareness**

Average score 5.8 / 10

### **What does the market or markets you are targeting look like?**

The primary target market for KnoWhere is the creative industries. More specifically, museums, exhibitions, theme parks, and immersive experience centers. The UK is at the forefront of these industries, making it the ideal beachhead market for us. Over the last 12 months, we have reached out to many experience designers and media experts and conducted interviews to better understand the market needs and how our solution can help with existing pain points. These conversations have also led us to identify our three key partners who offered non-financial support in our journey to complete the development of our technology.

These are some of the important takeaways from our conversations and studies:

- Non-interactive museums have seen footfall decreasing in recent years due to changing market dynamics and competition from immersive exhibitions.
- Designers of exhibitions do not have a way to collect information on how the space is used and the experience is perceived by the visitors.
- Increased demand for personalised and accessible cultural experiences will be a driver for growth.
- There is an expectation of AI technologies to open new possibilities for personalisation of experiences.

The global market for exhibitions was valued at \$60 billion in 2022 and it is expected to grow at 5% CAGR until 2029. Our conservative estimates, taking into account only the biggest venues (premier destinations), highlight that our initial beachhead market size could be around £200 million.

With immersive experiences still being an emerging field, the exact market size may be challenging to pinpoint. However, your project's focus on AI-enabled narrative engines could open up new market segments within the broader immersive tech space.

To explore this market's potential, strategic partnerships, direct sales to institutions, and a licensing model can be employed. Knowhere's approach aligns with the increasing demand for personalised, immersive experiences, suggesting a significant opportunity for growth and market penetration.

#### References:

- Li, J., Ochiai, Y., Wider, W., & Fauzi, M. A. A Bibliometric Analysis of Immersive Technology in Museum Exhibitions: Exploring User Experience. *Frontiers in Virtual Reality*, 4, 1240562.
- <https://www.precisionbusinessinsights.com/market-reports/exhibition-market/>

#### Assessor feedback

##### Assessor 1

The applicant demonstrates some understanding of the market. No information is shared on the competitive landscape or how the proposed innovation differs from incumbents.

##### Assessor 2

General dynamics of the wider market are understood, but the proposal lacks a strategy to get to their £200M "beachhead" market. The list of museums, theme parks etc needs to be thinned down and a first market identified.

##### Assessor 3

The global exhibitions market is defined and a beachhead market size is estimated: this could be refined further through a TAM SAM SOM approach, or a similar method. Some market drivers are identified and their relevance to the project could be more explicitly considered. Barriers to market entry could be identified and addressed appropriately.

**Assessor 4**

A general market description is provided. No specific attention is given to AI regulatory forthcoming issues, Personalisation is said to be targeted, without however considering the related ethical issues. It is doubtful that a robust emotion detection model can be derived in this project.

**Assessor 5**

The applicant has provided information demonstrating a good awareness of the target market. The data provided is referenced. There are several routes to market detailed and being considered. It is note that there are Partner organisations involved but it is unclear what services they may be providing and how this may impact on any developing IP ownership.

**7. Outcomes and route to market**

Average score 6.2 / 10

**How are you going to grow your business and increase long term productivity as a result of the project?**

The project aims to establish KnoWhere as a leading solution in the creative industries, particularly in museums, exhibitions, and immersive experiences. Our target customers are venue owners and experience creators who can benefit from real-time data analytics to improve visitor engagement and optimize space utilization.

Our go-to-market strategy involves a three-pronged approach:

1. Strategic partnerships with experience design agencies like Immersive International (<https://immersive.international>) to integrate our technology into their museum and exhibition projects, and guide our design choices.
2. Strategic partnerships with media production agencies. For instance, Badger and Coombs (<https://bcombes.com/>), affiliated with the University of Salford and the Media City UK (<https://www.mediacityuk.co.uk/innovation/>) home of the BBC and ITV, is interested in our attention-tracking technology.
3. Investigate direct sales to major venues and institutions like The British Museum, Tate Galleries, the Natural History Museum, and the Imperial War Museum North with whom we have already discussed this technology and have received positive feedback.

#### 4. A licensing model for smaller venues, galleries, and pop-up experiences, making the technology accessible to a broader range of customers.

We aim to target experience creators, curators, venue directors, and marketing managers who are looking to take their offerings to the next level through immersive personalisation. KnoWhere promises up to 30% increased visitor engagement based on our research on traffic between immersive exhibitions and traditional museums (see reference). Our partnership with leading designers (both in exhibitions and media space) provides validation and an initial, reliable client base.

By providing our technology platform as a service, we expect a substantial portion of our revenue to be recurring. Our projections suggest that 60% of our turnover will be recurring by Q2 2025 and the remaining 40% to come from consulting, setup, and maintenance activities.

**Reference:** Li, J., Ochiai, Y., Wider, W., & Fauzi, M. A. A Bibliometric Analysis of Immersive Technology in Museum Exhibitions: Exploring User Experience. *Frontiers in Virtual Reality*, 4, 1240562.

### Assessor feedback

#### Assessor 1

Route to market has been explained with current and potential partners. No pricing or revenue projections have been disclosed.

#### Assessor 2

Target customers are described. It's not obvious how the technological intervention is going to provide the benefits described. The information about revenue is not detailed enough. A company with only two employees is likely to be over-stretched if looking to work on three prongs and develop the technology.

#### Assessor 3

Specific target customers are identified and value propositions are outlined. A range of different value propositions could be expressed from the perspective of different target customer types/market segments. The business projections referenced here could be detailed further in order to more clearly demonstrate the potential for significant sustainable impact. Dissemination could be more explicitly considered here.

**Assessor 4**

The ability to implement the presented route to market heavily depends to the quality of the project outcomes. There are many concerns on the presented accomplishments.

**Assessor 5**

Target customers have been identified by the applicant and the value proposition detailed. The routes to market have also been described and projected percentage turnover increases provided

## 8. Wider impacts

Average score 5.0 / 10

### What impact might this project have outside the project team?

Beyond the immediate financial gains, KnoWhere is positioned to offer significant economic benefits by boosting the productivity of creative industries. It aligns well with government priorities related to technological innovation and economic growth. Environmentally, the project is designed to be sustainable, using minimal hardware and avoiding a large cloud computing footprint. The regional impacts include job creation and setting the UK as a leader in creative technology.

Regionally, we plan to dual site our R&D center in London and Manchester, creating high-skilled jobs and positioning the North West as a hub for immersive technologies. With an initial team of 5 expanding to 20 by 2025, we will create new employment and training opportunities in AI and computer vision.

We also aim to support charities and social enterprises through discounted licensing rates. Initiatives like hospital VR experiences and mindfulness exhibits can benefit greatly from our technology.

### Assessor feedback

**Assessor 1**

Not sufficient discussion has been provided under wider impacts. However, job creation has been quantified.

**Assessor 2**

Some reference to social benefits, but mostly focussed on economic. Some aspects of the response seem to be some way in the future (eg discounted licensing rates and hospital VR). Generally, rather low on detail.

### **Assessor 3**

Positive impacts could be explored further through closer consideration of potential impacts on supply chains. This consideration would benefit from the use of success criteria, measurable targets, timelines for benefits realisation, and an assessment of appropriate methods of both quantitative and qualitative evaluation. Potential negative impacts could be identified and mitigated where appropriate.

### **Assessor 4**

Due to the expressed concerns no significant wider impact is foreseen.

### **Assessor 5**

There is an awareness of the potential wider impacts that may be realised from the successful development of the project. There is consideration of how this may benefit third sector organisations and social enterprises showing a willingness to be inclusive. No negative impacts have been described.

## **9. Project management**

Average score 5.2 / 10

### **How will you manage your project effectively?**

#### **Key work packages:**

System Setup: Jointly managed by Marco Ghilardi (MG) and John O'Hare (JOH). Involves getting the hardware needed for the testing and setting up the physical space.

AI training in AWS environment: Led by MG. The goal is to train and refine the algorithms responsible for measuring eye gaze direction and emotion detection. This phase will also involve the implementation of bias mitigation measures and an AI safety review.

**AI System Integration:** Led by MG. During this phase, we need to optimise the performance and scheduling of the AI processes on the hardware to eliminate bottlenecks and lower the resource requirements for future versions. This means that future implementations will be much cheaper.

**Validation and Testing:** Jointly managed by MG and JOH. This phase will involve further testing and optimisation of the software and hardware integration and testing in a small exhibition space. At the conclusion of this phase, we would be only a few months away from bringing the product to the market.

### **Approach to Project Management:**

We'll adopt a Lean Price2Agile methodology, which combines the principles of Lean and Agile to efficiently manage resources and adapt to changes. We'll use Kanban boards to visualize work, manage flow, and optimize the lead time between task identification and completion. Tools like Jira will be employed for issue and project tracking, while Git will be used for version control.

### **Management Reporting Lines:**

JOH reports directly to MG. Each work package leader will present bi-weekly updates to MG, who will then compile a comprehensive monthly report for stakeholder review.

### **Project Plan Details:**

Our Gantt chart illustrates the project timeline, dependencies, and milestones. For instance, "Bandwidth Stress Testing" can only commence after "Hardware Deployment and Integration" is complete. This ensures that we have the necessary infrastructure to carry out the tests. Similarly, "Data Distribution" is dependent on the successful completion of "Capture Parameter Adjustment," to ensure that the data being distributed is of high quality.

This clear and comprehensive approach to project management, supported by clear reporting lines and a detailed project plan, positions us strongly for a successful and innovative project outcome.

[gantt.pdf \(opens in a new window\)](#)

[\(/application/10101453/form/question/37547/forminput/103195/file/622792/download\)](#).

### **Assessor feedback**

#### **Assessor 1**

A very simple Gantt Chart has been included. Work packages are not identified with associated costs. Approach to the project has been highlighted.

**Assessor 2**

The gantt is a waterfall that rapidly moves through several important phases of tech development. There is no mention how the AI or computer vision will be undertaken, and no mention of data to train the models. It's not clear if the AI is the computer vision or if it doing something different. NB the gantt is in very small font.

**Assessor 3**

The approach to project management is broadly appropriate for work of this kind; further consideration of how the project is designed to meet the objectives efficiently and realistically would be appropriate. The project work packages would benefit from further detail, including the total cost for each one and a consideration of milestones, links, and dependencies. The role of the project partners could be more detailed here.

**Assessor 4**

A normal project management approach is presented. A vague statement on the training/refinement of algorithms (which ones?) is only given including bias mitigation measures and AI safety review (?)

**Assessor 5**

A hybrid project management methodology is proposed. The work packages have not been described in much detail and the extremely high level Gantt chart would benefit from more description. Costings for each of the work packages would also be beneficial

## 10. Risks

Average score 7.0 / 10

### What are the main risks for this project?

Managing risks effectively is critical to the success of the KnоЮhere project, not least because of the powerful AI systems involved. Our comprehensive risk register can be found in the appendix and outlines potential challenges across various aspects of the project. Each section proactively identifies, assesses, and attempts to mitigate risks in a structured manner.

We recognize that risk management is an ongoing process, requiring regular review and adaptation. As such, we have a review frequency in place for every risk factor.

Our commitment to transparency and accountability is reflected in the clear design choice to strip out and discard almost all of the data. With a robust reporting and monitoring system in place, we maintain a clear oversight of risk statuses, enabling proactive adjustments to our strategies as required.

Our extensive investigation of risks was performed together with our corporate partners to de-risk the project as much as possible from day one.

Here we outline the main mitigation strategies to ensure that our AI solution is ethical and has low bias:

- Utilize diverse and representative data sets for model training and testing: Ensuring the data reflects diverse demographics and scenarios can help minimize biases. Our partners have agreed to help us collect the data needed from different existing installations around the world. This will also be a source of competitive advantage for us!
- Algorithmic auditing techniques: Methods like testing model performance across different demographic groups allow for detecting biases and uneven outcomes.
- Establish human-in-the-loop review processes: Having human experts periodically review samples of model outputs can identify biases that automated methods may miss.
- Consider a bias bounty program with clients: Rewarding external researchers who find biases incentivizes rigorous third-party auditing for blindspots.
- Build bias benchmarking tests: Proactively create test cases that expose potential issues, testing aspects like race, gender, age, and other attributes.
- Practice dataset minimization: Reduce risks of misuse by only retaining essential data for bias checking, and deleting non-critical data.
- Make fairness metrics transparent: Publicly share ongoing evaluation results on aspects like statistical parity, equality of odds, etc.
- Continuously update the bias detection framework: Regularly incorporate advances in techniques and community feedback to improve over time.

[riskRegister.pdf \(opens in a new window\)](#)

(/application/10101453/form/question/37548/forminput/103201/file/622822/download).

## Assessor feedback

### Assessor 1

A risk assessment has been conducted and a risk analysis is included. Key risks are further discussed.

### **Assessor 2**

All the risks presented in the form are technological. The applicant underestimates how difficult it is to collect and then label data ready for training. Other risks are in the appendix which is pretty comprehensive (and may infringe competition rules for its length)

### **Assessor 3**

The risk register identifies several key risks and brief mitigation is proposed. The risks relating to poor market reception and poor use by designers could be mitigated further through the clear involvement of an appropriate range of customer types, end-users, and beneficiaries throughout the project. Plans for ongoing risk identification, management, and mitigation are considered.

### **Assessor 4**

Many risks and mitigation strategies are described. However, trustworthiness of any AI system requires explainability, trust, responsibility, fairness. What are the associated risks and how are they mitigated? If the emotion estimation is wrong, this will have a very bad effect on the effectiveness of the system. Since nothing is mentioned about the methods used for this, there is great risk for such cases.

### **Assessor 5**

The applicant has provided a detailed risk register in which key risks have been identified and the mitigations detailed. It is clear that a project such as this requires specifically skilled staff and the risk of staff recruitment and retention has not been included and may be something that they may consider adding. There is also no mention relating to the risk/protection of any IP in development of the project.

## **11. Added value**

Average score 6.2 / 10

## How will this public funding help you to accelerate or enhance your approach to developing your project towards commercialisation?

The main impact of public funding in the short term would be to accelerate the research and development efforts and allow us to bring the product to market more rapidly. As explained in other areas of the application, our efforts will be targeted towards AI development and hardware fine-tuning to give us a really strong competitive advantage giving our company really strong future prospects. Public funding is also going to protect the funding team as the company's growth materialises: we can keep investing in product improvement and business development without being rushed by private investors with a short-term view.

Together with our first partners, having public backing will help our organisation in non-financial ways: the endorsement will mean that we will be able to limit the Marketing spending for a long time with respect to our current estimates. This will further improve the viability of our business and allow us to potentially reach new clients more easily.

If awarded the funding, we will be able to use the current cash flow to increase our R&D team size in 2024, therefore cutting down our time-to-market by 6 months. Our best-case scenario shows that, with public funds, we could bring KnoWhere to market within 6 months from the end of the programme. This acceleration is due to the fact that we can bring forward the pilot testing.

As a result of Innovate UK's backing, we believe that our Series A fundraising round would be able to attract higher-quality investors and more capital. Our advisors also believe that the additional product development and team size at the time of the capital raise, will increase the company valuation (roughly £2 million more). The extra capital will positively impact our capacity to grow our Engineering and Business Development functions.

## Assessor feedback

### Assessor 1

No information has been shared on external investors approached. The applicant discusses about raising Series A funding by passing pre-seed and seed funding stages.

### Assessor 2

Arguments for public funding are good but could have provided more information on alternative funding.

**Assessor 3**

The primary argument for public funding is based on time to market. Activities undertaken to evaluate alternative sources of support and/or funding could be detailed here, including rationales for discounting them or involving them in the ongoing funding strategy. Further detail on specific post-project R&D activities, by all project partners, that would be catalysed by public funding of the project could be provided here.

**Assessor 4**

The project can have good added value for the company, if successful.

**Assessor 5**

The justification for public funding is reasonable. It has not been stated whether alternative funding for this project have been considered but is implied in the response. There is a clear commitment to further R&D and a faster project delivery should funding be made available.

## 12. Costs and value for money

Average score 6.0 / 10

### How much will the project cost and how does it represent value for money for the team and the taxpayer?

The cost for the project is budget at £69,294. This includes the cost of developing and testing the innovative gaze and emotion-tracking AI capabilities. This project cost does not include any upfront investments for developing the rest of the architecture. Part of these costs have been already absorbed by the company and we estimate that we will invest roughly £35,000 more before the start of the project to improve the performance of the software.

During the project, part of the costs (around £7,000) will cover the expenses for testing the AI solutions in a realistic setting. We are also factoring in £3,000 to cover the cloud costs for training our algorithms, testing, and validation. Our largest cost driver is labor: with 2 engineers working on this full-time for 6 months.

QuasiScience will finance £20,788 (30%) of the cost of the project using the cash flow generated by current business activities: sales of internally developed software and consulting. We seek funding of £48,506 (70%) to be able to shift more internal resources to this promising project without affecting our risk of

default. Without the funding, we would risk exhausting our capital reserves very quickly. Furthermore, Innovate UK's 70% funding for the R&D elements, enables us to dedicate more internal funds and investor capital to commercialisation activities.

The public funding also de-risks the R&D phase and validates the technology's potential, making the project more appealing for private investors. This cost-sharing represents strong value for money for the taxpayer as our project's success has many positive externalities. For instance, museums will offer much more relevant experiences and this will promote the diffusion of Arts and Culture. The potential of our new platform technology will attract many creatives and result in new job opportunities and positive economic impact.

## Assessor feedback

### Assessor 1

Source of match funding identified. Value for money is not quantified.

### Assessor 2

The costs are reasonable. However, it's not clear who the salaries are for, since the two personnel are not named and hence unlikely to be the two members of the Team from an earlier section, yet no other team members were mentioned in that section.

### Assessor 3

The project costs could be justified in more detail through reference to fully costed work packages. Further detail on steps taken to ensure quality and value for money in all purchasing and procurement would be appropriate here. Arguments for positive externalities could be detailed further through reference to a more in-depth analysis of potential wider impacts.

### Assessor 4

Since the company has not developed, or collaborated with a Research Group with expertise in affect analysis, the project underestimates the cost of developing and testing innovative gaze and emotion-tracking AI capabilities, at a level that will be effective and trustworthy.

### Assessor 5

## Assessor feedback

### Assessor 1

Responses are weak and short. No financial projections are shared. Competitive landscape has not been discussed specially how the innovation differs. Route to market identified.

### Assessor 2

There is a substantial disconnect between what the proposal says the project will do and the technology described to do it. The early part of the proposal mentions a special form of display but this doesn't form part of the innovation disclosure. There are questions over the size of team.

### Assessor 3

The business case could be developed further through the use of recent relevant research and further detail on the work undertaken to date by the applicant. The project would benefit from further attention to human-centred design, including design for EDI. With this in mind, further detail on the involvement of a sufficiently broad and representative range of potential customers, end-users, and beneficiaries throughout the discovery, design, and testing activities of the project plan could be considered. The market analysis and the consideration of wider impacts would benefit from further attention.

### Assessor 4

The project targets outcomes which need the state-of-the-art of developments in human computer interaction and affect analysis. Only vague description is given on how these will be implemented. There are also major concerns following AI regulatory prospects and implementation strategies.

### Assessor 5

This is a very innovative project which has the potential to make significant improvements in the creative industries sector. The application lacked sufficient detail in the project planning response but provided a really comprehensive response in relation to risk management. The business models being considered are also looking to be able to provide some additional

**Competition name**

Feasibility studies for Artificial  
Intelligence solutions

**Application name**

VisionFlow

**When do you wish to start your  
project?**

11 September 2023

**Project duration in months**

5 months

**Has this application been previously  
submitted to Innovate UK?**

No

**Research category****Selected research category**

Feasibility studies

**Project summary**

No feedback provided

**Project summary**

Our project, VisionFlow, aims to develop novel pre-visualisation workflows for the virtual production industry by integrating open-source machine learning tools from Stability AI and open-source robot control software.

For example, consider a time travel film's early conversation. Stakeholders and shot planners could guide a city street scene's basic massing using Minecraft-like blocky primitives. Generative AI then produces different versions of a pan shot for various time periods. Trialling these against live talent, basic script, and lighting would reveal design issues. The 3D geometry could be exported into the normal Unreal workflows, saving time and costs while reducing confusion.

This innovative approach inverts the existing ICVFX workflow, driving camera motion from the scene rather than scene motion from a tracked camera. It aligns well with pre-viz workflows, allowing rapid ideation, horizontal scaling (through parallelized cloud vGPU), and expanded access to content creators since less software specialization is required.

The innovative workflow is as follows:

1. Instead of the conventional Unreal workflow, a simpler web or headset interface allows non-artists to create virtual 3D environments for new film scenes.
2. Directors describe a shot path in the software, laying out a shot like a traditional storyboard.
3. Generative AI rapidly creates high-resolution backdrop plates with correct parallax cues, unlike conventional image and video plates.
4. Within minutes, the camera path syncs to the robot, and the backdrop plates are displayed on the 3D wall or in the studio mixdown from a green screen. The shot can be run repeatedly, adjusting lighting and swapping out scenes for different ideas.

We will build upon the open-source Flossverse telecollaboration stack, which already offers MVP for large language models, translation, 2D content creation via voice command, cryptographic global storage, endpoint verification, and money flows. We will refine the integration and licensing element of this software expanding the potential for tele-collaboration. This allows us to access larger markets as the use case is proven and begins to scale.

## **Public description**

No feedback provided

### **Public description**

VisionFlow is a new approach to virtual production pre visualisation workflows, revolutionizing the way films are created and saving valuable time and resources. Our project aims to achieve just that by developing innovative pre-visualization workflows for the virtual production industry. By integrating open-source machine learning tools from Stability AI and open-source robot control software, we're looking to make virtual production more accessible and efficient.

Initially focusing on a regional scale, we plan to explore the wider opportunity through a market/product report. The intellectual property will be shared equally between both companies and initially published under the MIT open-source license. The project's driving force is the technical expertise of the group rather than specific outputs.

The open-source Flossverse telecollaboration stack forms the foundation of our project. It offers a minimum viable product for large language models, translation, 2D content creation via voice command, cryptographic global storage, endpoint verification, and money flows. This allows us to access larger markets as the use case is proven and begins to scale.

Our innovative workflow simplifies the process:

1. Non-artists create virtual 3D environments for new film scenes using a web or headset interface, replacing the conventional Unreal workflow.

2. Directors lay out shots like traditional storyboards by describing shot paths in the software.
3. Generative AI swiftly creates high-resolution backdrop plates with accurate parallax cues.

Within minutes, the camera path syncs to the robot, and backdrop plates are displayed on a 3D wall or in the studio mixdown from a green screen. The shot can be run repeatedly, adjusting lighting and swapping out scenes for different ideas.

For example, consider an early conversation in production of a time travel film. Stakeholders and shot planners could guide a city street scene's basic massing using Minecraft-like blocky primitives. Generative AI then produces different versions of a pan shot for various time periods. Testing these against live talent, basic script, and lighting would reveal design issues. The 3D geometry could be exported into the normal Unreal workflows, saving time and costs while reducing confusion.

Our innovative approach inverts the existing ICVFX workflow, driving camera motion from the scene rather than scene motion from a tracked camera. This aligns well with pre-viz workflows, allowing rapid ideation, horizontal scaling (through parallelized cloud vGPU), and expanded access to content creators since less software specialization is required.

## Scope

In scope 5/5

### How does your project align with the scope of this competition?

Video production and machine learning are progressing at a staggering pace, as seen in RunwayML Gen2, and for instance work by Private Island in London: "*Synthetic Summer*" is a machine learning interpretation of an American beer advert. It features no real people and is generated entirely from text prompts.

What seems under served at this time is inclusion of ML generative video in classic high end video production workflows. Cuebrick in the USA are making simple image backdrops using generative art, but it seems that the technology isn't making its way into the fairly conservative pipelines. Our proposal blends the cutting edge of open source video ML, open source telecollaboration, and compatibility with any virtual production workflow, using robotics.

## Assessor feedback

### Assessor 1

The project objective appears broadly within scope, proposing to use generative AI to address the efficiency of early-stage virtual production of video within Creative Industries, hence marked as "in scope". However, both

organisations appear to be technology research and development SMEs and from the information given, it appears that neither would themselves act as adopters of the technology to improve their own productivity.. would be more clearly within scope if a video production company was directly involved.

### **Assessor 2**

The project is led by a UK registered SME business entity with one other partner. The project is categorised as being within the creative industry. The project is within the scope of the call.

### **Assessor 3**

The application is SME led and brings innovation to film making through the use of AI the bringing it within the scope of the competition.

### **Assessor 4**

The applicant, SM Robotics Ltd, joined by one other partner, has proposed to develop pre-visualisation workflows for the virtual production industry by integrating open-source machine learning tools and robot control software. The aim is to create virtual 3D environments for new film scenes through a simpler web or headset interface. Generative AI rapidly creates high-resolution backdrop plates with correct parallax cues, allowing the camera path to sync to the robot within minutes.

### **Assessor 5**

Sophisticated ML generative video in high end video production could produce significant time savings for any production company and so this project falls within the scope of this competition.

## Application questions

### 1. Applicant location (not scored)

Applicant location

Manchester

No feedback provided

### 2. Minimal Financial Assistance declaration (not scored)

Minimal Financial Assistance declaration

No feedback provided

declaration attached

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### 3. Need or challenge

Average score 7.8 / 10

**What is the business need, technological challenge, or market opportunity behind your innovation?**

Virtual Production (VP) is a suite of technologies and processes that combine physical and virtual filmmaking techniques to save time, money, increase safety during film and TV production, and reduce the industry's ecological footprint. In-camera virtual effects (ICVXF), a subset of VP, utilizes 3D engines to create photorealistic sets displayed on large LED walls in real-time, immersing actors in a realistic environment instead of performing in front of a green screen.

The main motivation for the project is the industry's reluctance to seize the AI and ML-driven opportunities due to tight margins and difficulty explaining the advantages to clients. The project aims to develop a new workflow for the virtual production industry by offering "parallax plates as a service" through the integration of robotics hardware/software and open-source machine learning-

based video generation. This will significantly increase productivity during the "pre-visualization" stage and improve collaboration with film production and robotics companies early in the ideation process.

The current state-of-the-art in the ICVFX workflow includes:

1. Creating photorealistic scenes in Unreal Engine and tracking cameras for natural-feeling shots with parallax cues.
2. Using photographic and video "plates" to save costs but losing parallax cues essential for ICVFX.

Our proposed solution would replace the costly Unreal modelling element with AI-rendered options with our robot for repeatable shots against different backdrops. Yielding better, more cost-effective choices during the early stages of a film project, streamlining the Unreal creation pipeline, and generating additional revenue and process integration for robotics products.

The closest company working in this space is Cuebrick in the USA, which uses AI-generated art to create ready-to-use Unreal Engine environments for virtual production. However, our approach integrates robotics and AI-generated video for a more innovative and efficient workflow. Our technology partner 'flossverse' has demonstrated an early prototype. We proposed four work packages for the scoping study:

1. Conduct market analysis across the VP industry using flossverse contacts, to judge the size and scope of the savings, and market.
2. Integrate a new custom robot track with a commodity camera and a large TV screen, with the ML video process, against a physical foreground object, to demonstrate the physical process.
3. Explore and document the current state of the art in open source offerings, and explore their licenses, finding a path to the most permissive integration
4. Build a more refined and up-to-date workflow which clearly demonstrates the offering to market, testing this with externals where possible

## Assessor feedback

### Assessor 1

Plausible opportunity to explore potential productivity improvements by innovative use of AI within video content production sector. Answer might be improved by closer involvement of a video content producer within the feasibility study, and more quantified contextual info around envisaged impact

on business processes( eg current budget models for E2E production process vs targets that might be achievable with the proposed use of AI).

### **Assessor 2**

The project motivation is sound and convincing. The applicants have appropriately identified the nearest state of the art. The proposed solution has the potential to be market disruptive. The proposal demonstrates a good understanding of the business opportunity.

### **Assessor 3**

The identified challenge is clearly described and credible and represents an innovative application of AI. The potential competitors in the market are described and contrasted further justifying the innovation.

### **Assessor 4**

The applicant has presented an intriguing proposition that could potentially benefit UK competitiveness through practical applications. They have demonstrated a keen understanding of the external factors and competitors that necessitate improved innovation, as well as the obstacles involved. The proposal shows a strong drive to succeed, and the focus on innovation is a realistic avenue for enhancing UK productivity. Overall, the prospect of valuable enhancements arising from the proposal is tangible.

### **Assessor 5**

Having worked with Unreal Engine, I can see the appeal of your solution. This project is certainly worth examining for possibilities as the current process would benefit from the integration of AI-generated video.

## **4. Approach and innovation**

Average score 7.0 / 10

### **What approach will you take and where will the focus of the innovation be?**

To respond to the need, challenge, or opportunity identified, we will focus on the development and integration of a small-scale robotic camera system, AI-generated video, and tele-collaboration technologies. This will improve on the nearest current

state-of-the-art by streamlining workflows, reducing costs, and enhancing the flexibility of virtual production facilities.

Our approach to innovation will involve:

1. Applying existing technologies in new areas by integrating AI-generated video with motion control robotics for virtual production.
2. Developing new technologies for existing areas, such as the tele-collaboration suite for improved communication and collaboration in virtual production.
3. Exploring disruptive approaches that could transform the virtual production industry by replacing traditional workflows with more efficient and cost-effective solutions.

We have the freedom to operate in this domain, as our technologies and solutions do not infringe on existing patents or intellectual property rights.

This project fits with our current product, service lines, or offerings by complementing and enhancing our existing virtual production technologies and capabilities. It will make us more competitive by offering innovative solutions that address the growing market demand for cost-effective and efficient virtual production facilities.

The expected outputs from this project include:

1. A technical demonstrator showcasing the integration of the robotic camera system, AI-generated video, and tele-collaboration suite.
2. A market analysis report that provides insights into market size, customer segmentation, and competitive landscape.
3. Know-how and intellectual property related to the developed technologies and solutions.
4. New processes, products, or service designs that cater to the virtual production industry's needs and challenges.

These outputs will help us target the identified need, challenge, or opportunity by offering innovative solutions that improve virtual production workflows, reduce costs, and enhance the flexibility and efficiency of virtual production facilities.

[appendix-approach.pdf \(opens in a new window\)](#)

([/application/10079297/form/question/33437/forminput/90351/file/531684/download](#)).

## Assessor feedback

### Assessor 1

Approach seems plausible in principle as a feasibility study examining the potential to improve "Virtual Production" workflows. Answer might be improved

by a clearer, quantified modelling of "as-is" and "to-be" production processes within an example adopter organisation, demonstrating potential productivity improvements within a real-world process. The appendix, while providing some interesting background, is also confusing in parts and might usefully have provided some clearer illustrations and schematics of the intended process innovations, user and product journeys, etc.

### **Assessor 2**

The business opportunity is appropriately described. The horizon scan identifies the nearest state of the art. However, the horizon scan of other potential competitors is far from exhaustive. Potential rivals should have been identified if only to rule them out and demonstrate the superiority of the proposed solution. Innovation is credibly substantiated. However, the proposal fails to convincingly demonstrate whether the FTO analysis was conducted by a professional authority, such as a patent attorney. This is a considerable shortcoming.

### **Assessor 3**

The approach is limited by its lack of definition. A number of potential technological advances are described but others are suggested as possibilities. This adds significant risk to the potential for the delivery of the objectives.

### **Assessor 4**

The applicant has included a valuable addendum that offers additional context. The supplement has been professionally assembled and meets the established requirements. Furthermore, the accompanying materials showcase the applicant's initiative as well as their vision for the project, drawing a distinctive contrast with the competing model. The prospective creation from the candidate presents a fresh approach, backed up by thorough research to offer workable solutions. The driving force behind the proposal appears feasible and holds potential for a boost in effectiveness.

### **Assessor 5**

You provide a robust set of objectives for this feasibility study. I can only assume you have attempted experimenting with some of these ideas already given your clearly identified technology brief. A little more information relating to your "tele-collaboration suite" would have been useful in this section as this

element is key to the growth and appeal of your solution. It could clearly take many forms but I wonder if there might be too many security issues to deal with.

## 5. Team and resources

Average score 7.6 / 10

### Who is in the project team and what are their roles?

The project team consists of:

1. Dr. Sean Chase Mandrake Hill (SM Robotics) - Lead: Developing the MVP robotics system and integrating motion control with AI-generated camera track data. Expertise in visualization for robotics systems.
2. Dr. John O'Hare (flossverse) - Solutions Provision: Specializes in tele-collaboration, with experience in virtual production and developing open-source collaboration tools using AI/ML models for B2B solutions.
3. James Lewis (flossverse) - CPO/Product (to be subcontracted): Requires formal subcontracting, alternatively, Dr. O'Hare can cover project management roles and an agency can survey the industry.

Dr Hill and Dr O'Hare have known each other since 2011 and have closely collaborated on research at Salford University most notably on Sean's PhD which used similar robotics and display systems to all those in this bid. John O'Hare and James Lewis have known one another for around 20 years and are collaborating to examine this opportunity. The team has access to GPUs, robotics, cameras, and displays for scoping across SM Robotics and flossverse. There are no hard external dependencies.

External collaborations and resources may also include:

1. G6Moco (Visual Engineering & Robotics): Interested in experimenting on their small VP wall and large-scale robotics systems, potentially absorbing the cost as a non-financial project partner.
2. Pathway XR Innovation Lab (Trafford): Agreed to host G6Moco's robot for a day on their state-of-the-art Roe virtual production video wall, allowing a full project assessment during a test shoot with LED and an 8K Red camera on an industrial robot, absorbing the cost as part of their wish to develop the industry locally.
3. Hartree vGPU (optional): Useful for testing the system's speed on high-end cloud systems, though not a dependency as flossverse has the necessary equipment. There is a cost implication to this element, but we would propose very limited benchmarking only.

[team.pdf \(opens in a new window\)](#)  
(/application/10079297/form/question/33438/forminput/90357/file/529680/download).

## Assessor feedback

### Assessor 1

The team seem very well qualified technically and within the specialist application area; however, while it is good to see intent to engage collaboration partners such as "Pathway XR" the proposal might have benefited from more direct, committed input and participation by a "problem owner" ie a company currently producing video as its main business activity.

### Assessor 2

The assembled team possess the necessary skill and experience to realise the ambition of the project. The plan to obtain additional resources is credible and welcomed. However, the description of the facilities in which project work will be undertaken is insufficiently detailed. There is every reason to believe that the team members would work together.

### Assessor 3

The core team has a strong skill set to support the proposed work and innovation. However, the lack of a firm set of collaborators adds potential risk to the application and reduces credibility.

### Assessor 4

The project team described makes sense given the details described previously. There is also a useful appendix provided with some biographical detail provided on team members. From the information provided the team members appear to have the relevant skills and experience to complete their tasks however more detail could have been provided. The applicant does not discuss if additional recruitment is necessary, but does clarify no additional resources or facilities are required.

### Assessor 5

A very experienced and appropriate team of industry professionals to manage this feasibility study.

## 6. Market awareness

Average score 6.8 / 10

### What does the market you are targeting look like?

The virtual production market, being relatively new and spurred by the pandemic, is growing rapidly. The UK is emerging as a global hub for virtual production facilities, including Wakefield's virtual production park, Pathway, SODA, Vecta, Linney, and Recode in the NW, along with numerous facilities in London. These studios, whether using LED ICVFX or traditional greenscreen, can benefit from the cost savings and flexibility our proposed solution offers.

The target markets for the project outcomes encompass both domestic and international ICVFX and motion control robotics companies that could utilize the software and workflows under license. Initially, we aim to develop knowledge and capability at a regional scale, leveraging existing relationships with G6Moco, PathwayXR, Roe Visual in Wakefield, SODA in Manchester, and the emerging partnership between Salford/Peel Holdings and the University of Salford in MediaCity:UK.

Fortune Business analytics predict a doubling of the VP market from around £2.5B to around £6B over the next five years. Our project aims to explore the under utilised savings possible at the pre-visualisation end of the industry, building toward cost savings across the whole spectrum. Examining the product-market fit at this early stage of the industry will give confidence to investors and industry collaborators. Flossverse's telecollaboration suite, which connects to the robotics and underpins content creation, is in the early development stages and holds significant potential for the industry. The networks and conversations generated through this scoping proposal will likely yield additional ideas and opportunities both locally and globally.

Further market research is needed to determine the market size, structure, dynamics, customer segmentation, predicted growth rates, main supply or value chains, business models, barriers to entry, and the UK's position in targeting these markets. This information will provide a more comprehensive understanding of the market's potential and help guide the project's development as one of the workstreams, alongside our existing industry partners, and further afield.

We believe that we can save thousands of pounds per project on small scale facilities, and potentially tens of thousands per project on larger film studios like those in London. Such systems are charged out at many 10's of thousands of pounds per day, so even few hours saved during pre-vis can have significant impact.

### Assessor feedback

### **Assessor 1**

Useful general market overview, informed by useful local / regional connections and insights. A bit more commercially-minded, process-focused background and business inputs throughout the proposal might have helped underpin the market overview and give a more quantified sense of the real potential opportunities both for tech providers and for the content producers themselves.

### **Assessor 2**

The applicants demonstrate a sound understanding of the target market and its drivers. However, barriers to entry are insufficiently considered. The proposal recommends that the applicants conduct market research to determine barriers to entry. This is a significant shortcoming as it should have already been considered prior to applying for funding. Secondary markets are considered in insufficient detail which is a further shortcoming.

### **Assessor 3**

The applicants demonstrate a good awareness of what is an emerging market, metrics are provided where possible but these are less relevant for a rapidly growing new market. The work proposed within the feasibility study will help to build market knowledge.

### **Assessor 4**

The applicant has demonstrated a clear understanding of the target market size in the UK which is quantified and evidenced. There is a good awareness of other relevant markets and opportunities for the proposal. Barriers to market entry are also discussed.

### **Assessor 5**

Having worked in video production at the highest level, I am immensely proud of the UK industry as it is held in the highest regard globally. It also contributes significantly, as does the entire creative industries, to UK GDP. I believe it is important to nurture your expertise and vision and wish you all the success in this project.

## 7. Outcomes and route to market

Average score 6.6 / 10

### How are you going to grow your business and increase your productivity into the long term as a result of the project?

1. Current market position: The project targets the rapidly growing virtual production market, with the UK emerging as a global hub for facilities. We offer cost savings and flexibility to both LED ICVFX and traditional greenscreen studios. It further integrates robotic camera workflows into the VP landscape.
2. Target customers and value proposition: The target markets include domestic and international ICVFX and motion control robotics companies that could license the software and workflows. There is the potential to save thousands of pounds per project for small-scale facilities and potentially tens of thousands for larger film studios, and we seek to understand this market through demonstrations and research. Initially, we aim to develop knowledge and capability at a regional scale, leveraging existing relationships with G6Moco, PathwayXR, Roe Visual in Wakefield, SODA in Manchester, and the emerging partnership between Salford/Peel Holdings and the University of Salford in MediaCity:UK, scaling to global markets through the likes of Nvidia and Sony.
3. Route to market: Initially focusing on regional scale, leveraging existing relationships with key industry players. As the project progresses we will undertake market analysis to identify potential early adopters, develop targeted product/market fit strategies, and explore opportunities both locally and globally.
4. Profiting from innovation: By integrating the flossverse telecollaboration suite with robotics, VisionFlow offers a unique solution. As the technology matures we will refine the flossverse proposition of global talent development. When these systems can produce high-quality video shots, they may replace/augment Unreal workflows.
5. Short- and long-term productivity and growth: In the short term, the project will focus on 4K video and simple robot dolly shots, with a stretch goal of pan and dolly. In the long term, as the technology and market evolves we would aim to emerge as software as a service experts in this field.
6. Protecting and exploiting project outputs: We will adapt and contribute to open community offerings as required, while maintaining integration with the flossverse telecollaboration workflows. This approach will allow more democratized access to the workflows and drive the project's unique extended value proposition.

### Assessor feedback

#### Assessor 1

General approach to building on the feasibility study to create market interest and traction seems promising, pragmatic and well-informed from a technical and operational standpoint. Some more context of current practice, commercial models and pain-points from the perspective of an adopter might

have been helpful, and helped form some understanding of potential returns for both tech providers and content producers.

### **Assessor 2**

Target customers are appropriately described as is the value proposition. Routes to market plans are adequately considered. However, financial projections are inadequate. Based on the information provided it cannot be ascertained with any degree of certainty whether the venture will ever turn a profit. This is a weakness. Dissemination is insufficiently addressed, which is a further shortcoming.

### **Assessor 3**

The route to market is credible building on existing relationships and networks to develop customers. However, the potential for future growth and profitability are less well described.

### **Assessor 4**

The target customers are identified by the applicant and there is some evidence of a clear value proposition to them. The approach to the exploitation and dissemination of the project's outputs are well described. The applicant has also given projections for potential profit and growth for their proposal. The applicant has shown good consideration for the business model.

### **Assessor 5**

A sensible route to market. Not sure what you mean by "As the technology matures we will refine the flossverse proposition of global talent development" so be careful not to over jargon your proposition when pitching for second round development-funding or Series A investment.

## **8. Wider impacts**

Average score 7.8 / 10

### **What impact might this project have outside the project team?**

Economic benefits:

1. External parties: By offering a novel and cost-effective solution for virtual production, the project may lead to savings for virtual production facilities, reducing their dependence on more expensive alternatives.
2. Customers: End-users can benefit from reduced production costs, leading to more competitive pricing for their services and products.
3. Supply chain and broader industry: The project may drive innovation in the virtual production sector, encouraging new players to enter the market and existing ones to adapt their processes. This can lead to growth and increased competition in the industry.
4. UK economy: As the UK emerges as a global hub for virtual production, the project could contribute to the country's economic growth, attracting investments and creating new jobs.

**Impact on government priorities:** The project may support the government's focus on the creative industries and digital technologies, further strengthening the UK's position in these sectors.

**Environmental impacts:** Positive: The project could contribute to reducing the film industry's ecological footprint by offering more efficient and sustainable virtual production methods. Negative: The increased use of digital technology and data centres may lead to higher energy consumption.

1. Regional impacts: The project supports the growth of regional virtual production hubs, such as Wakefield's virtual production park, Pathway, SODA, Vecta, Linney, and Recode in the NW, as well as numerous facilities in London. By providing innovative and cost-effective solutions for virtual production, the project can attract more businesses to these hubs, contributing to the regional economy, job creation, and fostering a vibrant creative community in these areas.
2. Jobs and education: The project's innovative solutions and industry insights can inspire educational institutions to incorporate virtual production techniques and tools into their curricula, equipping the next generation of professionals.
3. Diversity and social inclusion: By democratizing access to virtual production tools and resources, the project can enable a wider range of creators to participate in the industry, fostering diversity in film and media content. The development of cost-effective and accessible solutions can help break down barriers to entry and level the playing field for independent filmmakers, smaller production companies, and creators from underrepresented backgrounds, promoting social inclusion within the creative sector.
4. Health, safety, and quality of life: Virtual production can help reduce the risks associated with on-location shoots, improving the overall safety of film production.

## **Assessor feedback**

### **Assessor 1**

Credible potential benefits to local and regional clusters, and to overall UK sector.

### **Assessor 2**

The applicants demonstrate good overall awareness of the wider ranging project impacts. Economic and environmental impacts have been considered but insufficiently quantified, which is a minor shortcoming. Regional impact is adequately described. Possible negative impacts have been adequately mitigated.

### **Assessor 3**

A number of credible wider impacts are described but not quantified.

### **Assessor 4**

The applicant demonstrates a good understanding of the positive impact that their innovation potential may have on customers and industry more broadly as well as other regional benefits. The applicant also explains the wider benefits from their proposal to the UK. Negative impacts of the innovation are not given by the applicant.

### **Assessor 5**

All very good points with a bonus on the UK Government's "Levelling Up" initiative.

## **9. Project management**

Average score 7.4 / 10

### **How will you manage the project effectively?**

Main work packages of the project:

1. Development of a small scale robotic camera system for integration and testing (Lead: SM-Robotics) Integrate a custom robot track with a commodity camera and screen, with the ML video process. This piece of work should be

undertaken first cheap testing relies on it's completion, though we can do some with G6Moco, potentially lessening the workload/responsibility for the lead company. SM-robotics does not see this as a high risk build. Liaise with the nominated externals (Pathway, G6Moco, etc to pay for any necessary "at scale" testing of the ideas. would be optional or as required **Projected cost £13,000**

2. AI-generated video, and LLM supported tele-collaboration (technology provider: flossverse) Explore and document the current state of the art in open source offerings, and explore their licenses. Build a technology demonstrator around the time travel film narrative. Build custom automated workflows from the best available software, which could (with guidance) be used in a live studio shoot scenario with a supportive technology innovator such as G6Moco, SODA, or Pathway **Projected cost £14,000**
3. Market analysis and research (flossverse James Lewis) Conduct market analysis to identify potential early adopters and develop product market fit and targeted marketing strategies. Assess the market size, structure, dynamics, customer segmentation, predicted growth rates, main supply/value chains, business models, barriers to entry, and the UK's position in targeting these markets. Though possibly informing the product development, this is an output in its own right and is targeted to scaling of the VP/ML/Robotics intersection after the project conclusion, representing valuable IP for both companies.  
**Projected cost £15,000**

Project management approach: Kanban or a Lightweight Prince2Agile methodology to manage the project, Establish clear communication channels, roles, and responsibilities. Implement practices to monitor progress, risks, and issues, and make necessary adjustments to ensure success. Document the processes and manage any web presence. **Projected cost £8000** Management reporting lines: James Lewis will be assigned to oversee the project and build out reporting and will report to John O'Hare. John O'Hare will feed back to Dr Hill who owns the problem space.

[KTNgantt.pdf \(opens in a new window\)](#)  
(/application/10079297/form/question/33442/forminput/90381/file/531742/download).

## Assessor feedback

### Assessor 1

Project seems well-structured as an early-stage investigation into the proposed technology application, and an assessment of its market potential; however, it might have been useful to see a closer focus on how productivity improvements / process cost savings for producers might be delivered and quantified

### Assessor 2

The work plan is fit for purpose and would result in the project being delivered within the designated time frame. Work packages are appropriately outlined. Credible project management methodologies have been nominated. Links between work packages are clearly communicated in the Gantt chart. However, project milestones are insufficient considered which is a shortcoming.

### **Assessor 3**

A project plan is provided with a number of discrete packages of work which are individually costed. The work plan is supported by a Gantt chart. The work plan could have been strengthened by the definition of deliverables and milestones to allow better monitoring of progress against objectives. The management approach is appropriate but costly considering the small size of the project.

### **Assessor 4**

The appendix provided is professionally prepared and lists the work packages, the total costs of each, the time scheduled to complete the work packages and the lead partner designated as lead responsibility for delivering each work package. The plan appears well designed for the projects objectives and clearly links the milestones between the work packages.

### **Assessor 5**

Workflow 2 will surely involve the liaison with lawyers in relation to IP, copyright, licensing and commercialisation. Perhaps you should allocate a little more to this aspect and a little less to market research given your market is very specialist and easily identified in the main.

## **10. Risks**

Average score 7.0 / 10

### **What are the main risks for this project?**

Technical risks:

- Integration challenges between open-source machine learning tools, robot control software, and existing virtual production workflows.

- Unforeseen limitations of generative AI in producing high-quality and accurate backdrop plates.
- Ensuring compatibility with various hardware and software platforms used in the virtual production industry.

Mitigation:

- Allocate dedicated time and resources for testing and refining integration processes, or else clearly demarcate where this cannot be implemented as an automated workflow within the current scope of the project
- Adapt to use different elements of the open community offerings, contributing as required into the projects through pull requests on GitHub. Make it clear that this is currently a pre-visualisation tool to support decision making but has ambitions to be a core part of high end video production when the time is right
- Confine the current scope of the project to achievable 4K video, and simple robot dolly shots, with a stretch goal of pan and dolly.
- Commercial risks:
  - Uncertain market adoption due to the novelty of the proposed solution.
  - Competition from established players or emerging alternatives in the virtual production industry.
  - Challenges in monetizing the solution through licensing or other business models.

Mitigation:

- Conduct a comprehensive market analysis to identify potential early adopters and develop targeted marketing strategies.
- Stay informed about competitive landscape and adapt the project's unique selling points accordingly. Maintain the integration with the flossverse tele-collaboration workflows which allow more democratised access to the workflows.
- Explore various revenue models and refine the project's value proposition to appeal to potential customers. Position for the moment when these systems can produce high quality video shots, completely replacing the Unreal workflows.
- Managerial risks:
  - Ensuring timely and efficient collaboration between project partners.
  - Managing project scope, timeline, and budget effectively.
  - Recruiting and retaining necessary expertise to execute the project.

Mitigation:

- Establish clear communication channels, roles, and responsibilities for all project partners.
- Implement robust project management practices (Lightweight Prince2Agile is proposed) with a simple Kanban fallback.

- James Lewis brings experience to the product, market analysis, and project management role, but in the event of his absence there is no issue rolling the project management days into Dr O'Hare's role which will then represent 36+22 days (68) of the 111 working days available. The market and product can be subcontracted as a workpackage to an agency as required.

## Legal risks

- Data protection and AI risk analysis should be performed for live use cases

## Mitigation:

- Obtain rough costs from the legal industry

[riskregister.pdf \(opens in a new window\)](#)

[\(/application/10079297/form/question/33443/forminput/90387/file/530025/download\)](#).

## Assessor feedback

### Assessor 1

Carefully-considered analysis of a range of technical and operational risks and uncertainties. Closer involvement from the outset of a problem owner company might have helped mitigate some of the uncertainties around the market fit and commercial model, ensuring that the right problem was being addressed.

### Assessor 2

Risk management is insufficiently addressed. The absence of a risk register is a significant shortcoming. There are a number of risks listed, however impact and severity have not been assessed. Consequently, critical risk has been insufficient identified and prioritised. The risks which have been listed have been appropriately mitigated, on the whole.

### Assessor 3

A large number of risks are identified and mitigated effectively. A likelihood and severity analysis would have strengthened the risk management further but there is a good balance between operational and technical risks.

### Assessor 4

The risk appendix provided is fairly well prepared, but it is difficult to follow due to the lack of demarcating each separate risk clearly. More attention to style and presentation should have been given. On the whole it appears that most of the key risks for the project are covered. The mitigation strategy is relatively simplistic. The risk analysis nevertheless is appropriate and relevant to the objectives of the project.

### **Assessor 5**

A good summary of the main risks and challengers. I certainly agree that your main risk is technical integration with third party software and licencing issues.

## **11. Added value** Average score 7.4 / 10

### **How will this public funding help you to accelerate or enhance your approach to developing your project towards commercialisation?**

This public funding would accelerate and enhance our approach to developing the project towards commercialisation by providing the following advantages:

1. Appeal to investors: Public funding would act as a strong endorsement of our project's potential, increasing its attractiveness to private investors who may be interested in supporting further development and expansion.
2. More partners: With public funding, we can demonstrate the project's value and potential to prospective partners, encouraging them to join and contribute their expertise, resources, and networks.
3. Reduced risk: Public funding would reduce the financial risk associated with the project, allowing us to focus on innovation, collaboration, and achieving the best possible results.
4. Faster route to market: With public funding, we could allocate more resources to R&D, streamline processes, and bring the project's products and services to market more quickly.

The likely impact of the project outcomes on the organisations involved includes:

1. Increased innovation and competitiveness: Successfully completing the project would result in new products, services, and expertise, positioning the organisations as leaders in the virtual production market.
2. Business growth: The project's success would lead to new revenue streams, customer segments, and opportunities for expansion.
3. Strengthened networks and collaborations: The project would foster strong working relationships and partnerships that could be leveraged for future

collaborations and opportunities.

We have approached other routes of investment, such as private investors, industry partners, and venture capital firms. However, securing public funding would greatly enhance our ability to attract further investment and partnerships.

Without public funding, the project's scope and timeline would be significantly constrained. R&D activities would be limited, and the project's progress towards commercialisation would be slower. This could result in reduced competitiveness and market impact.

By receiving public funding, the R&D activities of all organisations involved would be significantly boosted. They would be able to dedicate more resources, expertise, and time to the project, leading to better outcomes, a faster route to market, and a stronger competitive position in the rapidly growing virtual production market.

## Assessor feedback

### Assessor 1

Answer given seems plausible and reasonable in principle, but is very "generic" and does not really explain the rationale for InnovateUK funding for this specific project. A stronger answer might give more background on current funding streams and investors within the respective companies, what their current business positions / plans are, how InnovateUK support for this project might actually create growth and value and leverage follow-on funding, etc.

### Assessor 2

The proposal puts forward good arguments for the necessity for public funding. More traditional sources of funding have been appropriately identified and discounted. In the event that the project is funded, R&D activity will greatly increase.

### Assessor 3

The application has the potential for significant added value for the applicants and wider associates. Without the support from Innovate UK progress would be significantly diminished and slowed. Alternative sources have been explored but rejected due to the potential limitations imposed by external funders.

### **Assessor 4**

The justifications put forth for receiving public funding seem reasonable and valid. The individual seeking the grant asserts that their work can greatly advance with financial assistance. The applicant suggests that the project will be placed on hold if grant funding is not forthcoming. The applicant deems other funding options as not feasible.

### **Assessor 5**

There is no doubt that a grant from the UK Government would provide a massive endorsement to your project and firm. There is also little doubt in the acceleration of your idea to market. I believe this is extremely important for your innovation as the landscape will change when AI becomes heavily regulated and likely that existing technology will be grandfathered through.

## **12. Costs and value for money**

Average score 7.2 / 10

### **How much will the project cost and how does it represent value for money for the team and the taxpayer?**

The total eligible project costs are estimated at £50,000, with the following breakdown:

1. Development of a small-scale robotic camera system: £13,000
2. AI-generated video and LLM supported tele-collaboration: £14,000
3. Market analysis and research: £15,000
4. Project management: £8,000

We are requesting a grant of £50,000 to cover the entire project cost. Each partner will finance their contributions to the project using the grant, as follows:

- SM-Robotics: £13,000 (development of the robotic camera system)
- Flossverse: £22,000 (AI-generated video, tele-collaboration, and project management)
- Market analysis and research subcontractor (James Lewis or alternative): £15,000

This project represents value for money for both the team and the taxpayer because:

1. It aims to develop cutting-edge technologies and solutions that address a rapidly growing market, positioning the UK as a leader in virtual production.
2. The project's success will result in job creation, increased exports, and positive economic impacts for the UK.
3. Public funding will leverage additional investments from private investors and industry partners, further increasing the project's impact and benefits.

Compared to alternative investments, the project offers significant potential for growth, innovation, and economic returns, making it a high-value investment for both the team and the taxpayer.

The balance of costs and grant across the project partners reflects each partner's role and contribution to the project. The subcontractor costs for market analysis and research are critical to the project as they provide essential insights into the market, customer segmentation, and the UK's competitive position, helping to guide the project's development and commercialisation strategy.

We believe the project cost of £50,000 represents excellent value for money for the team and the taxpayer, as it supports the development of innovative solutions in a rapidly growing market, contributes to the UK's economic growth, and leverages additional investments and partnerships.

## **Assessor feedback**

### **Assessor 1**

Clear presentation of budget breakdown across WPs, partners and resources. The requirement to subcontract market analysis activities to someone who is also named as a staff member of a partner organisation is a little confusing and might merit clearer explanation.

### **Assessor 2**

The project costs are reasonable. The amount of money being requested ought to be enough to realise the ambition of the project. Grant funding is to be appropriately and equitably divided between the partners. However, as financial projections are inadequate, it cannot be ascertained whether the project represents good value for money.

### **Assessor 3**

# Assessor feedback

## Assessor 1

Proposal seems interesting in outline, and technically well-informed, but might have been improved with closer, earlier involvement with a candidate adopter organisation. More illustration and quantification of "as-is" and "to-be" production processes might have sharpened the application and improved alignment with the call.

## Assessor 2

The idea is sound and the proposed innovation has the potential to be market disruptive. However, the proposal contains multiple shortcomings, some of them serious which are highlighted within this report. As a result the project cannot be considered to be safe for funding in its current form.

## Assessor 3

The application is innovative yet builds on existing knowledge and software. The addition of AI capabilities shows potential for impact. However elements of the application are not well defined which does limit confidence in the actual deliverables.

## Assessor 4

The applicant, SM Robotics Ltd has proposed to develop pre-visualisation workflows for the virtual production industry by integrating open-source machine learning tools and robot control software. The aim is to create virtual 3D environments for new film scenes through a simpler web or headset interface. The project has valuable, practical applications to improve competitiveness. The applicant has shown good awareness of the wider factors and competitors influencing the need for better innovation and the challenges of doing so. There is a good motivation for the project. The innovation focus is plausible and could lead to valuable improvements in UK productivity.

## Assessor 5

Having worked in video production at the highest level, I am immensely proud of the UK industry as it is held in the highest regard globally. It also contributes significantly to UK GDP, as does the entire creative industries. I believe it is important to nurture your expertise and vision and wish you all the success in this project. My only advice would be to focus a little more closely on the legal aspects of IP, copyright and licensing with third part products before you dive too deeply into your development.