What is the Future of Film?

The future of film has been a source of great speculation in recent years - and for good reason. Digital technologies have disrupted the distribution pipeline, transforming the way in which audiences consume and challenging historic business models. Film formats and channels are rapidly multiplying and in an era of TikTok, Quibi and Disney+, to name but a few recent interventions, it is increasingly challenging to see film as a singular entity anymore.

In this context, it is perhaps more useful to think of there being multiple futures of film. This is exactly what the inaugural Future of Film Summit sought to capture - the day celebrated a diverse range of developments in filmmaking at the cutting edges - spanning new funding strategies to interactive audience engagement.

In particular, the Summit aimed to bridge the knowledge gap between practitioners and the rapidly evolving technologies that are transforming the production process.

"Realtime Game Engines (RTGEs), Virtual Production as well as AI tools are now disrupting the creative and economic practice of filmmaking. Significantly, many of the tools are now available at low cost or even for free, creating opportunities for a much wider and potentially more diverse community of storytellers.

At this time of rapid change, we believe that there is now an incredible opportunity to shape a new future for film - one that encompasses many more people and stories. The mission of Future of Film, therefore, is not to predict the future but rather to be the creative space where this future can be formed.

In order to do this we need to first pose a different question: what is the future of film that we would like to experience?

Through the outputs of the Future of Film Summit and the collaborative work at the Future of Film Think Tank we have developed the following response, in the form of this vision statement:

“The future of film is inclusive, sustainable and rewards innovation and creativity.”

This vision statement is not intended to be prescriptive or definitive. Instead we offer it as a beacon for the direction of travel. The purpose of this report is to help us navigate towards this vision. We aim to achieve this by empowering creators through the provision of expert technological knowledge and by offering immediate practical recommendations for film stakeholders.
The Real-Time Revolution: Game Technology Transforms the Filmmaking Process

The convergence of film and games is accelerating. Led by companies that originated in gaming, such as Unity and Unreal Engine, Realtime Game Engines (RTGEs) are now transforming the filmmaking process through the process known as Virtual Production.

A suite of tools and techniques, Virtual Production allows filmmakers the ability to virtually construct shots, sequences, or an entire film, without even setting foot on a physical set or location. The standard ‘development-pre-production-production-post-production’ workflow paradigm that has dominated film-production since the birth of cinema is now being flipped on its head in productions that contain VFX or CGI. With virtual production - all of the creative processes – which include live action, video and CGI imagery - can now begin simultaneously and in real-time within game-engine environments - as case studies such as Gravity and The Lion King show.

What is ‘Film’ Anyway?

Whilst we may feel we intuitively know what film 'is', the reality is that filmmaking has constantly evolved since the birth of cinema as a result of numerous artistic and creative interventions. Take the Vaudevillians as an example, they took the business of moving pictures to new levels, commercially and creatively in the early 20th Century. Likewise, from sound and colour to the advent of digital effects, new technologies and innovations have repeatedly been discovered, trialed and adopted to enhance cinematic storytelling.

From pioneering works like Minority Report, Fight Club and Gravity, much of the focus of the Future of Film Summit was concerned with narrative ‘feature-length’ cinema. However, defining what constitutes film in the era of Netflix, TikTok, Quibi and live cinema to name but a few disruptive interventions, is increasingly challenging.

Our aim is not to draw definitional barriers, rather we want to empower creators and this means to tell stories in whatever format fits best. We therefore draw on the BFI’s new and inclusive definition for ‘film’:

“anything that tells a story, expresses an idea or evokes an emotion through the art of the moving image, whilst honouring the platform for which the work was intended” BFI 2022

Ultimately our goal is to foster creativity - and creativity knows no barriers.
This opens up numerous creative and logistical opportunities - location-scouting can now take place in virtual space; establishing the dimensions of sets and scenes, placing props, deciding on lenses, mapping exact camera positions, angles and movements, as well as setting lighting and grip equipment (tracks, dollies, cranes etc). These activities can all be undertaken ‘live’ - changes and tweaks can then be made instantaneously and spontaneously. It means that a range of creative film-production personnel – directors, performers and designers are all able to see the composition of live action and virtual imagery whilst on set - actors are able to perform live both inside and in response to a digital set, in real time.

It means that creative teams can collaborate across geographic boundaries as they collectively inhabit a virtual set simultaneously. As well as these positive economic and environmental implications, Virtual Production opens up a process of creative experimentation and iteration that is normally not viable within the constraints of a film set.

Furthermore, it disrupts the often siloed nature of the traditional industrial film production workflow, where different creative departments work separately and at different points in the process. Virtual Production opens up the space for new interdisciplinary creative conversations between professionals who had previously worked at opposite ends of the production workflow.

"It's all multi-user and everyone can work in this virtual world together and it can be as light and nimble as a single iPad if that's all you want. But then if you suddenly decide, actually I'd like my DOP involved in this and my Production Designer and other creative team members, you can suddenly have a team looking at whatever it is you're looking at and everyone working together. And this is where I think the future is going for Virtual Production."

Tim Webber, Chief Creative Officer Framestore (Future of Film Summit 2019 Closing Keynote)

Real-time technologies can also negate the need for lengthy rendering and preview times enabling directors to view composited VFX images in Virtual Reality, on-location, during the shoot. This is revolutionising the film-production workflow, saving significant time and money, and most importantly unlocking exciting visual storytelling opportunities through the new creative freedom it affords to directors and VFX artists.

Perhaps the most exciting affordance of this film technology revolution is that it puts these opportunities in the hands of a diverse range of filmmakers un-bound by geographic location. Real-time software (such as Unity and Unreal Engine) is now freely accessible and off-the-shelf hardware including motion capture technology is available to consumers at relatively affordable prices.
Enhancing this accessibility is the increasing number of stock VFX and CGI assets which are available to purchase online under various types of licensing. One example is Turbo Squid which makes available 3D models used in 3D graphics. The ability to quickly and easily download pre-made digital assets with which to build a filmic world has a clear cost advantage to filmmakers of all levels.

**Machine Learning** (ML) has the potential to take this democratisation even further. For example, the creation of photo-realistic videos using on-line cloud-based tools which deploy computer-vision AI are now a reality, and are accessible at low-cost, again putting the technologies in the hands of new users and audiences. Take for example [Quixel](#) – where creatives can access detailed photogrammetry of hundreds of different environments which can be used in filmmaking. ML-powered tools such as [Kamua](#) - automated video editing software - can also assist creators to easily edit and repurpose their work for the increasing array of platforms and aspect ratios.

Just as these technologies take hold and begin to be more widely adopted, we know that there are other innovations whose impact is yet to be fully understood. Algorithmic Editing has the potential to interrupt another stage in the production cycle, opening up the practices and processes of editing to new creatives and new creative outcomes.

Currently, there is also widespread speculation about both the production and consumption practices which will be made possible with the advent of 5G mobile technology. In this period of perpetual evolution and rapid innovation we know that other new technologies will exist in research and development phase around the globe. Having the processes and practices in place to adapt to these will be a key factor in successful and sustainable progress in this domain.

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**The Filmmaker’s Perspective**

Hasraf “HaZ” Dulull is an independent filmmaker using Virtual Production throughout his projects.

“I am currently using Unreal Engine and Virtual Production to create a pilot episode for an animated series in development. Virtual Production allows me to be as hands on as possible from setting up the camera moves to choreographing the action - all inside Unreal Engine.

This not only speeds up the production process massively, it also removes a huge amount of back-and-forth between myself (the director) and the animation team. Because I set it up the scene, camera, action etc exactly as I want, I can then pass this directly to the team to work from and take it to the final version.

Realtime graphics with GPU is so powerful today, enabling me as a filmmaker to shape and play with ideas quickly without hindering the production schedule. It also allows me to quickly and effectively convey my ideas to financiers and partners (aka *pitch-vis*).”
New workflows, practices and funding structures are now required to adapt to these advances and to take full advantage of the opportunities they present. One of the key areas is around the creation and deployment of assets.

In the current production workflow, an asset such as a CGI character or object is created and used for a single platform. For example, the assets created for a film are not typically used for the game (or vice-versa), with each asset having their own distinct and siloed workflow.

RTGEs mean the same asset can be used for both linear and interactive content on multiple platforms: film, TV, games, print, live broadcast, live events, VR and AR. This could lead to the creation of a ‘nondestructive workflow’ whereby assets can be developed and used across multiple outputs from early-stage pitching and marketing to finished products. From concept to feature film, this sequential workflow would see the fidelity or resolution of the assets increase as the storytelling pipeline progresses.

In this scenario, assets can be readily deployed for different media. The initial ‘prototype’ designs used for pitching (‘pitch-vis’) to attract finance or previsualisation purposes (‘pre-vis’) would then be further developed and repurposed into full VFX as the project moves forward. As the project progresses, the level of detail of the assets progress too and they can be ‘funnelled off’ and utilised for storytelling or marketing purposes at the appropriate time in the appropriate format.

This model has potential to create significant new efficiencies in the production process. Simultaneously, the collateralisation of the money, work and time spent on assets that can be reused increases the capacity to tell a cohesive story across different channels.
In order to implement this model effectively, **standardisation is critical.** In much the same way a script is a standardised format that comprises information about the budgetary and creative components of a project, a universally recognised asset format for assets needs to be established. One suggestion for this is the **USD**, the **Universal Scene Descriptor**, a format originating from Pixar. USD essentially describes the change in any particular visual effect scene allowing for more effective collaborations and repurposing.

Hand in hand with a non destructive workflow, a different creative approach is also needed to effectively originate stories that can travel across media. This approach would be built upon very early stage cross department, cross discipline collaboration and not be restricted to any particular format.

**Worldbuilding** is a format neutral and platform agnostic approach to storytelling which entails defining and designing the wider world of the story in depth first, before the creation of the story. The benefits of this **interdisciplinary** approach lie in the generation of a convincing and thorough ‘world’ that can be exploited for many distinct or interrelated platforms.

This approach has historically been used predominantly in the creation of fictional fantasy or science fiction worlds popular in animation, fantasy and science fiction film (such as *Star Wars*) and games. However, we believe it can apply to an infinitely wider range of stories, genres and intellectual property. The worldbuilding approach may be used to develop social-realist film as readily as fantasy or science fiction.

Worldbuilding is characterised by the research and construction of the world before the development of any one specific story set within that world. The worldbuilding approach means creating the universe, the entire world within which a story of any form might unfold and would mean asking **and answering** a series of critical questions – eg. what is the:

- Culture
- Geography
- Politics
- Technology
- Social Structures
- Environment
- Kinship structure
- And many more besides

This attention to detail at the outset increases the richness and depth of the stories it produces.

The leading pioneer of worldbuilding in film, Alex McDowell set out to answer these critical questions through gathering real information from innovators working in experimental laboratories around the world in diverse fields such as HCI, robotics, prosthetics, architecture, physics and urban planning to name a few. His incredibly detailed and highly collaborative work in the development of the ‘world’ of *Minority Report* has led to numerous patents based on the ‘imagined’ technologies featured in the film.
The worldbuilding approach to storytelling does not easily align with the conventional model of film financing, where typically a format-specific script or treatment is the starting point.

A different creative and commercial infrastructure that is designed for this kind of collaborative and format-neutral storytelling is required. This could be described as a worldbuilding laboratory or ‘Story Incubator’ and the following schematic illustrates what this model might look like:

This model could be funded privately, publicly (there is also a good case for the latter given the experimental nature and current ‘market failure’ in this area) or through a mixture of both. Regardless of funding, a key feature would be a coalition of public and private partners and expertise from different sectors including commerce, technology, academia and science. As the illustration makes clear, it is a model that enables the development of assets that can evolve and be exploited for any number of possible platforms - games, VR, film, animation, immersive experiences etcetera.

The incubator, in theory, could be virtual, although a physical space is likely to provide more opportunities for collaboration and cross fertilisation among the cohort of invited storytellers or storybuilders.

There’s this reputation [Minority Report] has for having been predictive. All of that technology in the film was formed in our collaborative imagination between 2000-2001, but continues to become reality over and over again. The gesture recognition for example was a thesis project at MIT from scientist-engineer, and ‘historian of the future’ on the film, John Underkoffler. His project scaled into a technology that is now used by Fortune 500 companies all over the world. It exists because of the film, because the film told us that it had already happened. It’s not that we were being so clever, we were just doing deep research in the right places, and imagining those hints of reality as provocations to drive our future world”

Alex McDowell Future of Film Summit Keynote 2019
The cohort would be encouraged to develop their projects using worldbuilding principles and RTGE tools to rapidly prototype ideas and designs. The objective would be to enable creative teams to develop stories for the most effective platform(s) at which point additional commercial and/or public investment would be sought to realise these in full form.

Moving Into the Future of Film

We see the relationship between ‘format-agnostic’ storytelling and the fluid creative process of Virtual Production as a key axis in film’s future - and we believe that this can play a key role in realising our vision of that future which is “inclusive, sustainable and rewards innovation and creativity.”

Imagine a creative space and a workflow paradigm for the production of any type of genre - whether it be present day social realism, a period drama or a science-fiction fantasy - which enables the creation of rich, authentic, representative and engaging worlds. This is an environment that will facilitate a diverse range of creatives to bring their perspective, to represent their own world views, leading to a multitude of stories to emerge for audiences to experience across screens, platforms and immersive entertainment experiences.

The opening up of these creative spaces and workflows to a diverse range of voices and experiences is now a reality as the gap between professional and amateur technologies closes in this context of rapid change and innovation. These new workflows also create the potential for more economically viable and environmentally sustainable filmmaking.

We know that this future will not be built on today’s tools and technologies, because those will soon change. It will instead be built on a shared understanding of process - how things are done - through a common, open and accessible set of inclusive principles and practices that can be taken forwards and underpin the many futures of film.

The future of film will be a place where:

1. Filmmaking will be strengthened through increased interdisciplinarity - creative teams will bring together diverse world views, perspectives and multi-disciplinary skill sets.

2. The environmental benefits of collaborative working in virtual environments will be widely recognised and valued.

3. The widespread adoption of a ‘nondestructive workflow’ approach in asset creation and management will generate significant efficiencies and open up new cross-platform storytelling opportunities.

4. An increasing diversity of storytellers will realise the commercial and creative opportunities of exploiting IP across a variety of platforms - by adopting a “story first, format second” approach.

“Our objective is to create tools to augment imagination, to tell stories that are activating, powerful and mythological, which people can engage with and appropriate, both in film, games or any other platform or media in which they manifest.”

Juan Diaz Bohorquez, European Director World Building Institute
5. **Story Incubators** will be adopted by public funders and private companies as a new mechanism for film creation. In the future, **World** development will precede script development across all genres of film.

6. Leaders in games, film and immersive experiences will work together to define best practice for new workflows that can benefit all industries e.g. adopting **Universal Scene Descriptor** (USD) as benchmark practice.

7. **RTGE** and **Virtual Production** techniques will be taught in Film Schools and Universities.

8. **A diverse range of virtual assets**, from a range of organisations from cultural heritage institutions to commercial production entities, will travel fluidly across medium boundaries and communities of practice.
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