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AVGC-XR Policy

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The global Animation, Visual Effects, Gaming, Comics, and Extended Reality (AVGC-XR) industry has seen unprecedented growth in the last few years, becoming an integral part of the broader technological landscape. As per the most recent data, India's IT-BPM sector contributes around 8% to the national GDP, with the state of Karnataka playing a significant role by contributing 25-30% to the state's Gross State Domestic Product (GSDP). This existing technological prowess provides Karnataka with a strategic advantage in embracing and advancing in the AVGC-XR sectors.

Countries like Japan, South Korea, and Singapore have set global benchmarks in the development of AVGC-XR sectors by establishing dedicated centers of excellence, innovation hubs, and facilitating public-private partnerships. Their focus on integrating these sectors into mainstream industries has led to technological advancements that have implications far beyond entertainment—ranging from healthcare and education to real estate and manufacturing.

Taking inspiration from these global best practices, this Policy Document outlines the Government of Karnataka's strategic vision and targeted initiatives for the AVGC-XR sectors. A key component is the establishment of Centers of Excellence and innovation hubs across the state. These centers aim to create a collaborative environment involving academia, the private sector, and governmental agencies. They will serve as focal points for skill development, fostering innovation, and translating research into market-ready products and services.

Additionally, this document lays down a robust policy framework designed to accelerate growth in the AVGC-XR sectors. It includes a range of fiscal incentives, a streamlined regulatory environment, and the development of cutting-edge infrastructure. The objective is to provide a nurturing and enabling setting that allows both startups and established companies to flourish, ensuring that Karnataka becomes a prime destination for investments in these sectors.

In conclusion, the AVGC-XR Policy Document serves as a blueprint for establishing Karnataka as a global leader in these technologically advanced and creatively rich sectors. Through meticulous planning, strategic alliances, and a focus on sustainable growth and innovation, we are committed to shaping a future where Karnataka not only retains its pole position in the traditional IT-BPM sector but also emerges as a powerhouse in the global AVGC-XR landscape.

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1. INTRODUCTION: AVGC–XR AS A SUNRISE SECTOR

The rise of the AVGC-XR sector, encompassing Animation, Visual Effects, Gaming, Comics, and Extended Reality, has become a notable development within the broader Media and Entertainment industry. Driven by technological leaps in 5G, artificial intelligence, and augmented and virtual reality, this sector is well-positioned for significant growth. The innovations aren't merely incremental; they have the potential to revolutionize the way we consume media, offering more interactive and immersive experiences. Importantly, these advances have opened new avenues for content creators and studios, both big and small, to innovate and differentiate their offerings.

Investment in the AVGC-XR sector has been robust, with financial backing coming from a diverse set of stakeholders including venture capitalists, angel investors, and government bodies. This financial support has fueled R&D initiatives, enabling the development of cutting-edge technologies and techniques. In return, these advancements have made the sector increasingly lucrative, attracting even more investment in a virtuous cycle of growth and innovation.

Consumer behavior has also played a pivotal role in the sector's growth. The widespread adoption of smartphones and the popularity of Over-The-Top (OTT) platforms have created a large and growing audience seeking high-quality, immersive experiences. This consumer demand has, in turn, exerted pressure on content providers to continually up their game, leading to a cycle of mutual reinforcement that benefits both consumers and producers.

In India, the potential for the AVGC-XR sector is promising. With a burgeoning young population proficient in digital technologies, the country is a fertile ground for rapid adoption of AVGC-XR products and services. Industry reports, such as those from KPMG, project a bright future for this sector in India, estimating its valuation to reach nearly $30 billion in the next 5-7 years. Thus, the AVGC-XR sector in India is not just a subplot but a major component in the evolving story of the country's digital transformation.

1.1. Global AVGC-XR Market Overview

The global AVGC-XR market presents an expansive field of opportunities, driven by technological advancements and changing consumer behaviors. According to data from India's Ministry of Information and Broadcasting, the market was valued at over $366 billion[1] for the fiscal year 2021. A closer look reveals that Animation and Visual Effects (VFX) contribute to 46% of the market, whereas Gaming accounts for the remaining 54%. These are not stagnant figures but indicators of dynamic segments that are poised for considerable growth. The Animation & VFX industry is projected to grow at a CAGR of 10.94% over the next half-decade, while the Gaming industry trails closely behind with a projected CAGR of 9.64%.

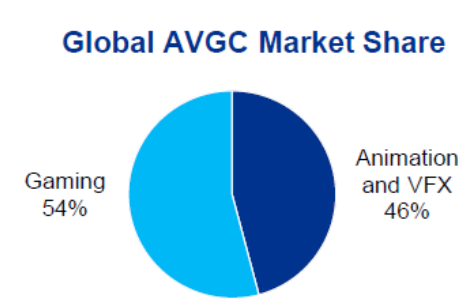

Fig. 1: AVGC Market Share

Table 1: Global Market Size for AVGC

AVGC Global Market	FY21 (in $ billion)	FY26 (in $ billion)*	FY30 (in $ billion)*
Animation and Visual Effects (VFX)	168.0	282.3	427.7
Gaming	198.4	314.4	454.3
Total	366.4	596.7	882.0

*Projected

Given these trends, financial projections are equally optimistic. Based on current rates, the Animation and VFX segment is expected to reach approximately $282.3 billion by FY26 and further expand to around $427.7 billion by FY30. On the other hand, the gaming industry is anticipated to grow to $314.4 billion by FY26 and escalate to an impressive $454.3 billion by FY30. This brings the total estimated value of the global AVGC-XR market to about $596.7 billion by FY26 and a staggering $882 billion by FY30.

It's important to consider the factors driving this growth. In the Animation & VFX segment, factors such as the rise of OTT platforms, an increase in demand for animated movies and series, and advancements in VFX technologies are key contributors. Meanwhile, the gaming industry is being propelled by the surge in mobile gaming, the growing e-sports phenomenon, and new business models like freemium games and in-app purchases. These trends are not just western phenomena but are globally ubiquitous, which amplifies the growth potential for companies operating in or entering these segments.

[1] Ministry of Information and Broadcasting, Government of India, Realizing AVGC-XR (Animation, Visual Effects, Gaming and Comics – Extended Reality) Sector Potential in India, December 2022 – Annexure C

Animation & VFX Sector: Growth Drivers

1. Metaverse creating a demand for real-time technology/ 3D modelling for perceptual interaction through XR devices.
2. Animated commercials are getting more traction among advertisers.
3. Increasing penetration in sectors: EdTech, Med-Tech and Architecture (CAGR of 11.7%).
4. Extended Reality (XR) growing: CAGR 25.9%.
5. AR/VR attracting investments to augment animation quality for enhanced gaming experience.

Box 1: Animation & VFX Growth

Gaming Market: Growth Drivers

1. Growing demand of high quality and realistic animation with an engaging VFX.
2. Mobile gaming is growing at a CAGR of 11.05% with increased smart phone penetration.
   - Console games also being adapted to mobile games
3. 5G shall enable better gaming experience: fast downloads/ uploads, glitch free multiplayer video games, live streaming, and real-time gaming.
4. Gaming companies investing in R&D
   - EA Sports spends ~25% in R&D
   - Sony's Gaming Division spends ~25% of total R&D in gaming

Box 2: Gaming Sector: Growth

In summary, the global AVGC-XR market is not only large but also growing at an impressive pace, opening avenues for new entrants, and providing existing players with opportunities to expand and innovate. The increasingly digital nature of global entertainment consumption, coupled with innovations in hardware and software, suggests that the sector is well-positioned for sustained long-term growth. As such, for investors, entrepreneurs, and governments alike, the AVGC-XR sector represents a promising area for focus and investment.

1.2. India's Untapped Potential in AVGC-XR

When it comes to the Animation, Visual Effects, Gaming, Comics and Extended Reality (AVGC-XR) sector, India holds a position of untapped potential, currently accounting for less than 1% of the global market. However, this should not be perceived as a limitation but as an opportunity for growth. Government forecasts suggest that with appropriate interventions, India could secure up to 3% of the global market by FY30. This would mean that the Indian AVGC-XR market could reach $26 billion by FY30.

The fiscal data elaborates on this potential more concretely. In FY21, the Indian Animation and VFX sector was valued at approximately $1.13 billion, and the gaming sector stood at about $1.9 billion. These figures are projected to reach around $4.2 billion for Animation and VFX and approximately $4.7 billion for gaming by FY26. By FY30, the numbers look even more promising: $13.1 billion in Animation and VFX, and $13.3 billion in gaming, aggregating to $26.4 billion across the AVGC-XR sector

AVGC Market	FY21 (in $ Billion)	FY26 (in $ Billion)	FY30 (in $ Billion)
Animation and Visual Effects (VFX)	1.13	4.2	13.1
Gaming	1.9	4.7	13.3
Total	3.03	8.9	26.4

**Projected*

In terms of investment and employment, the Indian market is already seen a robust growth. From 2014 to 2020, Indian gaming startups attracted $350 million in venture capital funding, and the sector is growing at an impressive CAGR of 22%. The sector's employment statistics further underline its growth potential. While 180,000 professionals are currently employed in the AVGC-XR sector, it is estimated that another 2 million jobs will be added by 2030.

In conclusion, India's AVGC-XR sector is a hotbed of untapped potential. The relatively small share in the global market offers tremendous opportunities for growth, investment and employment in this sector. As technologies continue to advance and consumption habits shift, India is primed to become an epicenter of AVGC-XR innovation and expansion, making it an ideal landscape for investors and professionals alike.

1.3. Karnataka's leadership in the AVGC-XR

Karnataka, recognized as India's IT hub, is also carving out a leadership position in the Animation, Visual Effects, Gaming, Comics, and Extended Reality (AVGC-XR) sector. With a

robust 20% share of the Indian Media & Entertainment industry, the state hosts over 300 specialized AVGC-XR studios and has a professional workforce exceeding 15,000, providing a strong base for industry growth.

Education also plays a vital role in the state's AVGC-XR landscape. Current statistics show that Karnataka is home to 5 institutes dedicated to animation, 3 for visual effects, and 12 focused on gaming. These educational establishments make up a significant fraction of India's 139 institutes in these specialized fields, creating a fertile training ground for future industry leaders.[2] The state also has setup Digital Art Centers in 27 colleges catering to 400 students and 1 AVGC-XR Finishing School with 842 students trained.

The state government's initiatives add another layer of credibility to its claim to leadership position in the sector. Not only has the state established India's first AVGC-XR Centre of Excellence, but it has also launched a dedicated AVGC-XR Fund, which is investing in two groundbreaking startups.[3] These steps demonstrate Karnataka's commitment to accelerating growth in this sector.

Significantly, Karnataka is the only state in India releasing its third 5-year AVGC-XR policy, with the first policy having been initiated in 2012. What sets this upcoming policy apart is its forward-thinking approach: it aims not just to strategize for the next five years, but to lay a foundation for sustainable growth and development for a considerable future beyond that period. This long-term vision amplifies Karnataka's commitment to the sector, making the state an epicenter for investment and innovation in the burgeoning AVGC-XR industry.

1.4. Keys Challenges faced by the AVGC-XR sector in India and Karnataka

The Animation, Visual Effects, Gaming, Comics, and Extended Reality (AVGC-XR) sector in India and specifically in Karnataka faces multiple challenges that act as roadblocks to its growth and scalability. The sector, although brimming with potential, grapples with infrastructure, educational, regulatory, and financial constraints that need to be effectively addressed to realize its full potential.

Talent Gap and Skill Development: One of the major challenges facing the AVGC-XR industry in both India and Karnataka is the acute shortage of qualified and skilled professionals. While educational institutions have mushroomed, the quality of education in the relevant skills like animation, game design, and visual effects is often sub-par. The

[2] Ministry of Information and Broadcasting, Government of India, Realising AVGC-XR (Animation, Visual Effects, Gaming and Comics – Extended Reality) Sector Potential in India, December 2022 – Annexure C

[3] Startup Cell, KITS

curriculum in many of these institutions is outdated and not in sync with the needs of the industry, leading to a significant talent gap.

Lack of Funding and Investment: Funding represents another significant challenge for the sector, especially for startups and smaller enterprises. Karnataka has taken a step in the right direction with its dedicated AVGC-XR Fund, but lack of financial backing hampers innovation, scalability, and the ability of these companies to compete globally.

Technological Constraints: In a sector so heavily reliant on technology, outdated hardware and software can be damaging. The swift pace at which technology in the AVGC-XR sector evolves is often not matched by companies and educational institutes due to the high costs involved in constant upgrades.

Regulatory Hurdles: Regulations in India around media and entertainment can often be tricky to navigate and may present challenges, especially for the gaming and extended reality segments. Censorship rules and intellectual property rights needs improvement for the sector to thrive.

Market Reach and Consumer Acceptance: While the global AVGC-XR market is vast, the Indian sub-segment is still evolving. Market reach within the domestic sphere is limited and convincing the Indian consumer to pay for AVGC-XR products is an ongoing challenge. Cultural attitudes towards gaming and animation as non-serious or trivial forms of entertainment also affect consumer willingness to spend.

High Competition and Low Entry Barriers: The ease of entry into the AVGC-XR sector has led to a market with high levels of competition. Many freelancers and small studios offer services at lower rates, making it hard for larger, more established companies to maintain profitability without compromising on quality.

Lack of Infrastructure: While Karnataka has made strides with its AVGC-XR Centre of Excellence, the infrastructure across India for this sector is still in nascent stages. Necessities like high-speed internet, advanced computing facilities, and specialized training centers are yet to be universally accessible.

Dependency on Outsourced Projects: A large chunk of the revenue for the AVGC-XR sector in India comes from outsourced projects from countries like the USA and UK. This dependency makes the sector vulnerable to economic fluctuations in these countries and can have a cascading impact on the Indian market.

Cultural and Linguistic Diversity: India's diversity, while being a strength, can also pose a challenge in terms of content localization and cultural sensitivities. The content that appeals to one demographic may not be well-received by another, making market research and consumer understanding paramount.

Shortage of Original IP: The Indian AVGC-XR industry produces a limited amount of original content, relying instead on adaptations or outsourced work. The lack of original IPs not only affects revenue but also hampers the industry's standing on a global platform.

These challenges offer a multi-faceted view of the hurdles that the AVGC-XR sector faces in India and Karnataka. However, challenges also signify opportunities for growth and innovation. With targeted interventions from both the government and private stakeholders, these issues can be tackled to unlock the untapped potential of the AVGC-XR sector in India and Karnataka.

2. POLICY ROADMAP

2.1. Vision:

Global Leadership in Innovation: Strive to make Karnataka a leader in emerging technologies such as AI, AR/VR, within the AVGC-XR sector.

Global Talent Hub: Transform Karnataka into a Centre of Excellence for AVGC-XR related skills, attracting students and professionals to Karnataka for education and career development in this sector.

Decentralization: Establish emerging clusters, in addition to Bengaluru, as hubs for AVGC-XR, to distribute economic benefits more evenly across the state.

Sustainability & Inclusion: Incorporate sustainability and inclusivity in the AVGC-XR industry by 2029. Embed ESG (Environmental, Social, Governance) criteria into the AVGC-XR sector's operational ethos.

Intellectual Property Protection: Establish Karnataka as a pioneering state in IPP within the AVGC-XR sector where robust legislative frameworks, cutting edge technological safeguards to deter piracy, thereby fostering a secure and thriving ecosystem for creators, investors, and consumers.

Empowering India's Cultural Legacy: Position India as a global leader in the AVGC-XR sector by harnessing and amplifying the country's rich cultural heritage, developing immersive experiences representing India's diverse traditions, stories, art forms, elevating them to international acclaim and fostering cultural exchange.

2.2. Goals:

Growth: Facilitate the establishment and growth of at least 200 AVGC-XR companies, including 50 that are particularly innovative or high-profile.

Digital Transformation: By 2029, achieve a 30% increase in operational efficiencies, a 20% boost in creative output, and a 25% expansion in digital marketing reach in the AVGC-XR sector, enabled by targeted investments in digital infrastructure, skill building programs, and regulatory reforms

Education, Training & Employment: Create awareness among youth about the opportunities encompassing both education and employment prospects within the AVGC-XR sector and Create 30,000 new, high-quality jobs in the sector by 2029, with a focus on

roles requiring specialized skills in emerging technologies. Partner with 200 or more educational institutions and industry, including MOOC platforms, to train at least 50,000 individuals in AVGC-XR specific and standardized skills.

Export Growth: Aim for exports to constitute at least 80% of the sector's total revenue, thereby also positively impacting the state's balance of trade.

2.3. Strategies: Policy Pillars

The Government of Karnataka recognizes the transformative power of the Animation, Visual Effects, Gaming, Comics and Extended Reality (AVGC-XR), as industries that will shape the future of entertainment, education, and even the way business is conducted. These industries are not only aligned with the future but also deeply rooted in creativity and innovation, areas where Karnataka has always aspired to be a leader. Therefore, the development of a comprehensive and forward-looking AVGC-XR Policy for 2024-2029 is not just a strategic move but a necessity to keep the state at the forefront of technological advancements and job creation.

The AVGC-XR Policy has been carefully designed to be futuristic, extending its vision beyond the immediate 5-year window. The objective is to build a resilient and sustainable ecosystem that can adapt to future technological disruptions while continuing to foster creativity, economic growth, and social equity.

The policy is structured around six key pillars, each focusing on a different yet interrelated aspect of the AVGC and XR sectors.

2.3.1. **Pillar 1:** Skill Development for a Future-Ready Workforce

The Skill Advisory Committee for Emerging Technologies comprising an esteemed panel of experts representing industry, academia, and government has been formed with the objectives of the identification of skilling requirements in emerging technologies; fostering industry collaboration; policy advocacy and action-oriented recommendations; documentation and communication mechanisms; and expected outcomes for stakeholders.

Due to the AVGC-XR sector's exponential growth in recent times, sector's distinct skill sets and its burgeoning relevance in the State's creative and tech ecosystems, **a separate Working Group under the Committee has been formed specifically for the AVGC-XR sector** in identifying and addressing the specific skill gaps and industry needs. The working group will not only focus on improving the current infrastructure and schemes available for the sector, but also implement new initiatives as mentioned below.

- **Holistic Curriculum Development:** Partnering with global educational institutes and industry, the intention is to curate a world-class curriculum that caters to diverse needs, from animation and visual effects to business management. The aim is not just to meet the present industry standards but to also preempt future trends by integrating emergent technologies like Metaverse, AI, machine learning, and blockchain. The industry endorsed courses will be designed holistically comprising these areas
    - Animation & Visual Effects
    - Game Design & Development
    - Virtual Reality (VR) & Augmented Reality (AR)
    - eSports (Game of Skill)
    - Digital Art & Illustration
    - Sound Design & Engineering
    - Intellectual Property & Legal Framework
    - Business & Monetization Strategies
    - Data Analytics & User Experience
    - Post-Production & Editing
    - Quality Assurance & Testing
- **Vocational Training:** Formal education will be complemented by comprehensive vocational training in partnership with Industry and Academia. Testing labs and e-learning platforms are slated to be the primary vehicles driving this vision. This initiative is crucial in ensuring that opportunities in the AVGC and XR sectors reach emerging clusters of the state, particularly in rural regions, and underprivileged areas.
- **Innovative Platforms for Talent Recognition:** Hackathons and startup challenges, will be organized in collaboration with industry leaders, where prodigious talent can shine. The Government of Karnataka will organize several events such as GAFX, Bengaluru Tech Summit (BTS), E-Gaming Summit etc. which will include specific hackathons, startup challenges and subsequent rewards for the winners.

In addition to the working group, the Government of Karnataka has established many tie ups with the industry and academia to impart next gen skills to students and entrepreneurs in the AVGC-XR sector in the State.

- **Centre of Excellence (CoE) for AVGC-XR:** The Government, in partnership with ABAI (Association of Bangalore Animation Industry), has setup a Centre of Excellence for AVGC-XR in 2018, which has been playing an active role in bolstering the sector's infrastructure. The CoE operates on a PPP model, aiming to craft a dynamic ecosystem for the AVGC-XR industry. The CoE also houses a Digital Postproduction Lab and an AVGC-XR Finishing School which provides incubation and acceleration for budding startups of the State. There are further plans to expand the CoE and its facilities in other emerging clusters of the State such as Mangalore, Mysore, Hubli/Dharwad Clusters.

As a follow-up to the hugely successful first of its kind AVGC-XR centre of excellence in the country, a version 2.0 of the same is proposed as a part of this policy which will encompass new emerging technologies along with the existing framework & focus on a future ready production & skills enhancement setup with emphasis being on encouraging startup culture & incubation centers. The AVGC-XR centre of excellence 2.0 to support national and international Gaming companies, VC, PE funds for to startups in conducting international events.

- **Digital Art Centers (DACs) 2.0:** Recognizing fine art schools as talent bed for the AVGC-XR sector, the Government of Karnataka has taken strides to bridge the awareness gap about digital art and animation careers. Currently there are 27 DACs functioning in the State in partnership with various academic institutes of the State and plans are to upgrade the current engagement infrastructure with the DAC framework to adapt and use new tools and technologies like Generative AI and Machine learning. This endeavor is poised for expansion, targeting 50 more fine art colleges across Karnataka.
- **Technology Business Incubators (TBIs):** TBIs play an important role in fostering innovation and entrepreneurship in the technology sector by supporting startups and early-stage enterprises in Karnataka. Currently there are 5 TBIs which are associated with renowned academic institutions or research centers of the State such as The Indian Institute of Science, Manipal Academy of Higher Education, Ramaiah University of Applied Sciences, and others.

  On a similar model, The Government of Karnataka plans to introduce new TBIs specifically for the AVGC-XR sectors in the emerging clusters of the State i.e. Mangalore, Mysore, Hubli/Dharwad Clusters. These TBIs will also provide co-working spaces for the new AVGC-XR companies. with a funding support of up to INR 10 Crore per TBI for over a period of 5 years. The TBIs shall forge a strong link between R&D and commercialization of technologies in Academic/Technical/ R&D Institutions.
- **Regulatory Innovation: The Karnataka Innovation Authority**, with its mandate to address regulatory challenges and promote innovation, aspires to establish **Regulatory Sandboxes** specifically for the AVGC-XR sector to provide Startups and Businesses a structure environment to test their innovations without being confined by existing regulatory frameworks. These sandboxes once implemented are expected to yield multiple positive outcomes such as fast track development and deployment of AVGC-XR products & services and deeper collaboration between industry players, regulators, and policymakers, ensuring continuous improvement in regulatory frameworks with the growth of sector.

2.3.2. **Pillar 2:** Creation of Sustainable Infrastructure

- **AVGC-XR Park (SEZ cum tourism center):** The state will aspire to establish a dedicated AVGC-XR Park in Bengaluru in the form of Special Economic Zones (SEZ) under Public-Private Partnership (PPP) model to offer companies multiple fiscal incentives. The AVGC-XR Park will be a pioneering world class hub for innovation, creativity and enterprise and will feature advanced infrastructure, reduced property taxes, and subsidized utility rates, creating an inviting ecosystem for both hardware manufacturing and software development companies.

  The Park will house spaces for cutting edge studios and production houses, software development, game design & development etc.; incubation centers; training institutes; entertainment zones and convention centers.

  The park will also integrate tourism with elements like interactive AVGC-XR museums, themed entertainment zones based on popular animations and games, and annual festivals, conventions and events attracting global participants.

  The SEZ may also allocate nearby land to premier real estate developers to create modern residential complexes, amenities including shopping, entertainment, and recreational spaces along with green parks and open spaces ensuring sustainability. The government will plan to implement smart-grid technology across the park which will ensure efficient energy consumption, reducing operational costs and minimizing environmental impact. Green buildings with energy-efficient designs will also be a standard feature of this SEZ.

- **The Center of Excellence (CoE) for Gaming**: Karnataka aims to serve as the epicenter for innovation, research, and development in the gaming sector. It will house state-of-the-art facilities such as high-performance computing clusters, simulation labs, and testing zones to support all aspects of game development from concept to deployment. Educational programs and workshops will be an integral component, partnering with academic institutions to offer specialized courses in game design, animation, and responsible gaming practices. Cutting-edge R&D will be conducted in collaboration with industry experts, focusing on emerging trends like augmented reality, virtual reality, and AI in gaming.

  Functionally, the CoE will adopt a multi-stakeholder approach involving the government, industry, and academia. It will offer incubation support for startups, including mentorship from industry veterans and access to funding channels. Regular events like hackathons, game jams, and industry conferences will be organized to foster innovation and networking. Regulatory guidelines will be developed in collaboration with legal experts to ensure responsible and ethical gaming practices. A dedicated team will continuously monitor market trends, ensuring that the CoE's objectives and activities align with both

technological advancements and societal needs. Through these multi-faceted operations, the CoE will strive to elevate Karnataka as a global hub for responsible and innovative gaming.

A specialized **Game Development Center** will serve as a hub for game designers, developers, artists, and other industry experts to collaborate, create, and innovate the realm of gaming. The center will provide essential resources, state of the art technologies, mentorships, and training programs. Moreover, an integration of Game Development Centers with Center of Excellence for Gaming will further amplify growth and innovation of the gaming sector. The gaming development centers within the CoE, will have a focused commitment to fostering talent, research, and technology advancements, providing a structured framework for game developers to thrive and contribute to the flourishing landscape of E-Gaming.

2.3.3. **Pillar 3:** Empowering Startups and MSMEs

Understanding the role of startups and MSMEs in economic vitality, the Government of Karnataka aims to create an enabling environment for these entities. This will begin with the provision of informational workshops to disseminate knowledge about existing schemes and incentives.

The next step in empowering these enterprises is the establishment of incubators and accelerators specializing in the AVGC and XR sectors in the emerging clusters such as Mangalore, Mysore, Hubli/Dharwad Cluster. These platforms will offer mentorship, resources, and seed funding, acting as catalysts in the early stages of a startup. Complementing this will be the AVGC Venture Fund (KITVEN AVGC FUND) designed to provide financial impetus to promising startups and MSMEs, particularly those focusing on breakthrough technologies or innovative solutions.

2.3.4. **Pillar 4:** Provision for Global Market Access and Business Development

- **Global Innovation Alliance (GIA):** At the core of this global outreach strategy is the Global Innovation Alliances (GIA) initiative by the Karnataka government. Through GIA, the state will foster meaningful collaborations with international tech hubs and innovation epicenters. This will lead to enriching exchanges of knowledge, open avenues for co-investments, and provide the much-needed market access for Karnataka's burgeoning AVGC and XR products. These strategic alliances will not only enable the assimilation of

advanced technologies and industry best practices but also pave the way for co-funded ventures, showcasing Karnataka's unique innovations on the world stage. GIA has partnerships and market access with 32+ countries spread across Europe, Asia, Oceania, North America, South America, and Africa.

- **AVGC-XR IP Marketplace:** A standout feature in the state's integrated strategy is the creation of a state-level AVGC-XR IP marketplace, streamlined through public-private partnerships. This marketplace is envisioned as the central hub for all IP transactions—buying, selling, and licensing—specifically catering to the AVGC and XR domains. Utilizing blockchain technology, it will ensure a secure and transparent transactional environment, offering peace of mind to all participants.

  Integrating the concept of **Technology Transfer Offices (TTOs)** within this marketplace will further refine its offerings. TTOs, traditionally associated with academic and research institutions, specialize in facilitating the commercialization of innovations, safeguarding intellectual property rights, and promoting collaborations between research entities and industries. In the context of the AVGC-XR IP marketplace, TTOs will serve as intermediaries, ensuring that innovations, especially those originating from academic settings, are seamlessly transitioned into commercial ventures, while also providing IP advisory and protection services. This fusion of TTOs into the marketplace ecosystem underscores the state's commitment to bridging the gap between invention and commercialization.

  The GIA aligned with the TTOs within the AVGC-XR marketplace has potential to form a dynamic ecosystem that propels AVGC companies in Karnataka towards international market access. Through its global collaboration, networking initiatives provides exposure and co-investment activities. The AVGC-XR IP marketplace will ensure transparency for international stakeholders creating an effective and efficient ecosystem for AVGC companies. The Technology Transfer Offices that are to be established within the AVGC-XR IP marketplace, will act as an intermediary to ensure seamless transition of innovation to the international market.

2.3.5. **Pillar 5:** Incentives, Concessions and Financial Support for Sustainable Growth

The Government of Karnataka has been proactive in devising mechanisms that offer both incentives and direct financial support to businesses in these domains. One of the most prominent initiatives in this context is the Karnataka Information Technology Venture Capital Fund: KITVEN Fund-4 (AVGC).

KITVEN Fund-4 (AVGC) is a dedicated Venture Capital Fund in collaboration with other entities in the state. With a corpus of INR 20 crore, this fund specifically targets enterprises operating in the Animation, Visual Effects, Gaming, Comics and Extended Reality, and other allied sectors within Karnataka. Investments typically range from INR 50 lakhs to INR 100 lakhs during the initial stages but based on the potential and performance of the company, this can be further augmented up to INR 200 lakhs as follow-on investment. This fund, beyond being just a financial instrument, symbolizes the state's commitment to nurturing and scaling innovative ventures in the AVGC-XR domain.

Alongside this, the government aims to introduce a tiered incentives system that rewards companies based on their contributions to sustainability, local employment, skill development, and innovation. These incentives are envisioned to act as a catalyst for companies to align their objectives with broader societal and environmental goals.

2.3.6. **Pillar 6:** Focus on **'Multiplatform'** AVGC-XR Products

The multiplatform gaming technology sector is ripe with opportunities and represents a rapidly growing subset of the AVGC-XR industry. The government of Karnataka seeks to prioritize this by introducing incentives and R&D grants specifically designed for companies focusing on 'Multi-platform Gaming' products specifically scanning\photogrammetry and Portable Mocap unit using mobile-based AI tools. This initiative is envisioned to spur innovation and attract investment into this burgeoning sub-sector.

Moreover, **AVGC-XR Products Testing Labs** will be in the Center of Excellence for Gaming to ensure the quality and performance of mobile-centric AVGC-XR products. These labs will be complemented by specialized training programs aimed at skill development in multi-platform products. These measures will ensure that Karnataka is not just a hub for AVGC and XR technologies but is also at the cutting edge of the fast-evolving multi-platform gaming sector.

3. FINANCIAL SUPPORT

The Government of Karnataka aims to foster AVGC-XR industry to build sustainability, scale, and critical mass. It also envisages providing full support to the development of high-quality creative works in the state. To facilitate the various objectives of the policy, host of incentives and concessions will be applicable for the industry throughout the policy period.

3.1. General Eligibility for Availing Financial Support

Only registered KAVGC companies can apply for the subsidies/incentives/grants available under this policy.

A first-time applicant needs to apply for registration as a KAVGC company by completing the KAVGC registration form. There is a one-time charge of INR 10,000 for KAVGC registration that should be paid as a demand draft in favor of "Managing Director, KBITS". If the company has previously registered as a Karnataka IT-BT company, there is no charge. Instead, the company may attach a copy of the Karnataka IT-BT registration certificate along with its application.

Eligibility Criteria

Location: The company or entity should be registered in Karnataka under the Karnataka Shops and Commercial Establishment Act, 1961

Employment: Company employs at least 50 percent of its total workforce in Karnataka, which will not include contract employees

Application Process

Interested companies can apply for KAVGC registration through the online portal http://www.itbt.karnataka.gov.in, attaching the soft copies of all supporting documents.

Additionally, the Government of Karnataka will exempt all AVGC-XR companies from the applicability of Karnataka Industrial Employment (Standing Orders) Rules, 1961, for a period of 5 years, with appropriate clause for protection of women employees and prevention of sexual harassment in workplace. Also, all AVGC-XR companies will be treated at par with public utilities to exempt them from the disruptive effects of general strikes/bandhs.

3.2. Skill Development & Job Creation

The initiative for skill development and job creation is structured as a partnership between educational institutions and industry. The aim is to bridge the gap between academia and the professional world by incentivizing collaborative educational programs. Through this symbiotic relationship, colleges and universities can offer curricula that are directly aligned with industry needs, while businesses gain the advantage of a skilled, job-ready workforce. The incentive serves as a catalyst, ensuring mutual benefits and fostering economic growth.

Incentive Details:

— **Reimbursement of training fees:** Up to 50% reimbursement of the course expenses, which needs to be translated as a discount in student fees. The incentive is capped at INR 7.5 Lakhs per company for the policy period

— **Reimbursement of PF/ESI:** Reimbursement of Provident Fund (PF) / Employees State Insurance (ESI) of INR 3,000 per employee per month for the first year of employment. This incentive is applicable for new jobs created and capped at INR 12 lakhs per company for the policy period

Eligibility Criteria:

— **Reimbursement of training fees:** Accredited Colleges or Institutes in Karnataka offering specialized courses in gaming, animation, or related fields. It is mandatory for each employee to obtain a certification for the training undertaken. Such certification should be issued by a recognized college or training institute registered in the state. The entity claiming the incentive and the certifying entity should not be same and related by any provisions whatsoever. This incentive cannot be availed if an entity has already availed the incentives provided by Skills Council for upskilling of talent force.

— **Reimbursement of PF/ESI:** Companies in the AVGC-XR sector operating in Karnataka. The employer's contribution is less than INR 10,000. Employee data will be verified through PF/ESI departments. The employee should be on the payrolls of the company. The company should not be operating for more than 3 years on the date of claim.

Requirements for Institutions:

— **Course Syllabus:** Submit a comprehensive course syllabus relevant to the sector

— **Faculty Credentials:** Provide a list of faculty members who will be teaching the course, including their qualifications, experience, and areas of expertise.

- **Infrastructure Details:** Submit an inventory list of available infrastructure, such as classrooms, computer labs, and software relevant to the course.
- **Student Evaluation Metrics:** Provide a framework for how student performance will be assessed throughout the course, in alignment with industry needs.
- **Monitoring and Feedback Mechanism:** Implement a system for regular monitoring and feedback involving industry partners to ensure course relevance and quality.

Requirements for Company:

- **Company Profile:** Submit a detailed profile, including operational history, areas of expertise, and previous educational collaborations if any
- **Skill Requirements:** List the specific skills that the industry requires from potential employees, to help tailor the course content
- **Joint Declaration Letter:** A letter also endorsed by the respective institute on how many students are being enrolled from the company
- **Resource Allocation:** Details of resources the company will provide for the course, such as guest lecturers, software, or real-world projects for course work
- **Evaluation Involvement:** A plan describing how the industry partner will be involved in the evaluation process, ensuring that the skills imparted align with industry needs.

By fulfilling these requirements, educational institutions and industry partners become eligible for the incentive, fostering a symbiotic relationship that benefits students, colleges, and the industry.

3.3. Early-Stage Startup Support Program

Description:

The Early-Stage Startup Support Program aims to ease financial constraints for startups in their formative years. The program provides partial cost coverage for manpower, marketing, infrastructure, operations, and compliance to help startups focus on growth and product development.

Incentives:

- **Marketing Costs:** Up to 40% capped at INR 1,00,000 reimbursement towards expenses on promotional material, participation in domestic exhibition/fair/expo (hiring of booth spaces and associated cost of travel for the participation) per company during the policy period
- **Leasing Costs:** Subsidized office or co-working space rentals covering up to 40% of the cost capped to INR 2,00,000 per company during the policy period

— **Operational Costs:** Up to 50% reimbursement towards server space rentals for one year, capped at INR 50,000 per company during the policy period
— **Compliance Costs:** Up to 50% reimbursement on legal and compliance costs incurred during company setup, capped at INR 2,00,000 per company during the policy period

Eligibility Criteria:

— The startup must be registered in Karnataka and have been in operations for less than 2 years on the date of application of first claim
— Must have a working prototype or MVP (Minimum Viable Product).
— Number of employees should be fewer than 15, employed full-time.

Requirements:

— **Business Plan:** A detailed business plan including objectives, market research, and financial forecasts
— **Financial Statements:** Latest financial statements or ledgers showcasing expenditures
— **Employee Records:** A list of all current employees along with their job descriptions, salaries, and employment contracts
— **Proof of Expenses:** Receipts and invoices for any claimed expenses like server rentals, office space, and legal fees

This program aims to provide the necessary financial support to early-stage startups, helping them survive and grow during the initial, critical years.

3.4. Infrastructure

Incentive Details:

IT Infrastructure: Up to 20% of the cost incurred, capped at INR 20 Lakhs limited to 5 sanction per company during the policy period. Purchases of IT Hardware equipment applicable for an AVGC-XR company. Software and licenses are not eligible.

Rental Benefits: Up to 20% of the cost incurred, capped at INR 5 Lakhs per company during the policy period. A company can claim this incentive either bi-annually or annually during the policy period.

Eligibility Criteria:

— **New and existing KAVGC Companies:** Companies that are newly established and operating in the Animation, Visual Effects, Gaming, Comics and Extended Reality (AVGC-XR) sectors

Requirements:

- **Authenticity:** Companies must purchase required and eligible equipment from Original Equipment Manufacturers (OEMs) only
- **Quality Standards:** The equipment purchased must not be used and refurbished
- **Purchase and Invoice:** Companies must submit a valid GST invoice for the one-time purchase of hardware, gaming, and data storage equipment. Leasing and/or annual subscription will not be eligible under this incentive
- **Rental Receipts:** Valid rent receipt with applicable GST or PAN number of landlord/leasing company should be submitted for the claim.

3.5. IP Creation and Protection

Incentive Details: Up to 50% of the costs for IP filing and legal consultation, capped at INR 20 Lakhs for International IP and 5 Lakhs for Domestic IP, per company during the policy period.

Eligibility Criteria:

- **KAVGC Companies:** Companies that are formally registered and operating in sectors such as Animation, Visual Effects, Gaming, Comics, and Extended Reality or related industries.

Requirements:

- **Demonstrable Original Work:** Eligible parties must have original work that can be legally considered as Intellectual Property (IP). This could include original characters, storylines, game mechanisms, etc.
- **Legal Consultation:** Applicants should show proof of consultation with legal advisors specializing in IP to ensure the work is indeed original and can be filed for IP protection.
- **IP Filing:** Eligible entities or individuals must actively engage in or plan to engage in the process of IP filing, whether it is for copyright, trademark, or patent, relevant to their creation.
- **Budget and Expenses:** Detailed records must be kept of the costs incurred for IP filing and legal consultation, which will be necessary for reimbursement.
- **Timeline:** The process for IP filing and protection should be completed within a timeframe that aligns with the policy guidelines.
- **Documentary Evidence:** All stages of IP creation and protection should be documented. This may include legal agreements, application forms, and receipts from relevant authorities or consultants.

— **Monitoring and Reporting:** Periodic reporting may be required to ensure that the support for IP creation and protection is being used effectively and aligns with the policy's objectives.

3.6. Production Grants

AVGC-XR production grants have been designed to promote both domestic and international AVGC-XR productions made within the state. In establishing these grants, the Govt. of Karnataka recognizes that large budget productions and Post Digital and Visual Effects (PDV) activity contribute to the state's overall development by providing valuable economic, employment and skill development opportunities. These grants will ensure that Karnataka remains competitive in attracting large budget productions and PDV activity from across the globe.

Qualified Expenditure:

Costs and expenses incurred by the production house or content creator during the pre-production / production / post-production activities of a Project would be considered as Qualified Expenditure, subject to the following definitions:

— cost of personnel working on the project
— costs incurred for hire of studio and office space and utilities
— hire of equipment / subscription fees for software used for the defined activity

The qualified expenditure should have been incurred within the state within the policy period.

3.6.1. For Animation Film

Incentive Details: Reimbursement of up to 20% of the qualified expenditure, capped at INR 50 Lakhs per company; limited to 2 sanction per company during the policy period.

Eligibility Criteria:

— **Animation Companies:** KAVGC Companies actively engaged in the production of animation content, particularly films, are eligible for this incentive.

Requirements:

— **Film Duration:** The animation film for which the grant is sought should be a minimum of 60 minutes in length.

— **Quality Standards:** The animation film must meet specific quality standards, which could be based on scripting, animation quality, and post-production processes.
— **Distribution Plan:** Companies should have a clear distribution plan, detailing how the animation film will reach audiences, including any partnerships with distribution channels or platforms.
— **Reporting and Documentation:** Detailed documentation of production costs, timelines, and other relevant metrics must be maintained for audit purposes.
— **Monitoring and Milestones:** Periodic monitoring may be required, and milestones may be set to ensure that the production is progressing as planned.
— **Content Guidelines:** The film should align with any content guidelines set forth in the policy, such as cultural relevance or the intended audience demographic.

3.6.2. For Animation Series

Incentive Details: Reimbursement of up to 20% of the qualified expenditure, capped at INR 15 lakhs for 22 minutes, INR 10 lakhs for 11 minutes and INR 5 lakhs for 6 minutes series, with a maximum cap of 30 lakhs limited to 5 sanctions per company during the policy period.

Eligibility Criteria:

— **Animation Companies:** KAVGC Companies actively engaged in the production of animation content, particularly films, are eligible for this incentive

Requirements:

— **Episode Count:** The animation series should comprise a minimum of 10 episodes of at least 22, 11, 6 minutes each to be eligible for the grant
— **Quality Assurance:** The series must meet or exceed certain quality criteria, such as animation fidelity, voice acting, and scriptwriting
— **Distribution Strategy:** A well-defined distribution strategy must be in place, outlining how the series will be distributed, either through traditional broadcast mediums or online platforms
— **Documentation:** Detailed financial records, including invoices and expenditure reports, must be maintained, and submitted for verification
— **Monitoring and Reporting:** The company will be subject to periodic reviews to ensure that the funds are being used as intended and the series is progressing according to plan
— **Content Guidelines:** The animation series should adhere to any content guidelines specified in the policy, which may include age-appropriateness, cultural representation, and thematic elements

3.6.3. For VR/AR/VFX Projects

Incentive Details: Reimbursement of up to 20% of the qualified expenditure, capped at INR 50 Lakhs per company during the policy period; limited to 3 sanctions per company during the policy period.

Eligibility Criteria:

- **Registered Companies:** Must be KAVGC registered entities specializing in Virtual Reality (VR), Augmented Reality (AR), or Visual Effects (VFX).
- **Domestic Production:** The companies should be engaged in domestic productions, thus aiding the local VR/AR/VFX ecosystem.

Requirements:

- **Contract Value:** The project under consideration must have a contract value above INR 10 Lakhs to be eligible for this incentive.
- **Quality Assurance:** The project must meet specific industry standards concerning quality, such as rendering quality, user interaction, and overall visual experience.
- **Monitoring and Reporting:** The company will be subjected to periodic reviews to ensure that the project progresses according to the planned milestones and the funds are being used for their intended purpose.
- **Documentation:** Detailed financial records, including invoices and expenditure reports, must be maintained, and submitted for verification.
- **Technical Guidelines:** The VR/AR/VFX projects must adhere to any technical guidelines specified, like frame rates, resolution, and interactivity.
- **Content Guidelines:** The projects should also comply with any content guidelines in the policy, which could encompass factors like age-appropriateness and cultural relevance.
- **Client or Partner Requirements**: If the project is being developed for a client or in collaboration with another entity, evidence of the contractual obligations and deliverables should be presented.

3.6.4. For Game Development

Incentive Details:
Mobile Gaming: Reimbursement of up to 20% of the qualified expenditure capped at INR 5 Lakhs limited to 2 sanctions per company during the policy period

Non-Mobile Gaming: Reimbursement of up to 20% of the qualified expenditure capped at INR 5 Lakhs limited to 2 sanctions per company during the policy period

Eligibility Criteria:

- **Game Development Companies:** Companies must be KAVGC registered entities that specialize in game development.
- **Branding:** Companies should produce games marketed under their brand name, signifying ownership and creative control.
- **Applicability:** For games developed during the policy period.

Requirements for Mobile Gaming Platform:

- **Download Metrics:** Companies should demonstrate a collective total unit of 2 Lacs (200,000) download across iOS, Google Play, and Windows platforms to qualify for the incentive. The metrics serve as proof of the game's popularity and potential impact.
- **Content Guidelines:** The games developed should adhere to existing content guidelines, including age-appropriateness and cultural sensitivities.
- **Technical Standards:** Companies are expected to comply with technical standards related to gameplay, UI/UX, and server response times, among others.
- **Monitoring and Documentation:** Companies will be subject to periodic reviews, where they should provide detailed financial records, technical milestones, and user engagement metrics.
- **Local Production:** Preference may be given to games that incorporate localized content or themes, enhancing the cultural and social value of the product.

Requirements for Non-Mobile Platforms:

- **Sales Metrics (including both Digital and Physical):** For PC games, a minimum of 5,000 units sold/downloaded through PC gaming platforms like Steam or Epic Games Store; For Console Games, a minimum of 2,500 units sold/downloaded for PlayStation or Xbox; within the first six months of release
- **User Engagement:** A minimum average of 20 hours of gameplay per user within the first 3 months after release
- **Subscription Models:** For games offered under a subscription model, a minimum of 1,000 active monthly subscriptions maintained with a minimum 70% retention rate over a period of 3 consecutive months
- **Content Guidelines:** The games developed should adhere to existing content guidelines, including age-appropriateness and cultural sensitivities
- **Technical Standards:** Companies are expected to comply with technical standards related to gameplay, UI/UX, and server response times, among others
- **Monitoring and Documentation:** Companies will be subject to periodic reviews, where they should provide detailed financial records, technical milestones, and user engagement metrics

— **Local Production:** Preference may be given to games that incorporate localized content or themes, enhancing the cultural and social value of the product

3.6.5. For International Productions

This incentive serves as a catalyst to drive export growth in India's AVGC-XR industry and aims to not only attract and nurture talent and innovation by providing financial support for projects with international scope, but also to facilitate the influx of foreign capital.

Incentive Details: Reimbursement of up to 20% of the qualified expenditure, capped at INR 1 Crore per company limited to 2 sanctions during the policy period

Eligibility Criteria:

— **Registered Companies:** KAVGC companies that specialize in international productions in the categories listed below.

Types of Projects:

— **Animated Films & Series**: Projects can be animated films (minimum 60 minutes) or series (minimum 6 episodes with duration of at least 25 minutes each) meant for international audiences.
— **AR/VR/VFX**: Augmented Reality, Virtual Reality, and Visual Effects projects with international scope.
— **Game Art Development**: Specialized game art developed for international projects can also qualify.

Requirements:

— **Minimum Project Value:** The contract value of the project should be at least INR 2.5 Crores to qualify for this incentive.
— **Global Partners:** The project should have confirmed involvement from at least one international partner or client.
— **Compliance:** Projects should comply with international standards of quality and legal requirements, including copyright laws and trade agreements.
— **Financial Records:** Detailed financial reports and a clear budgetary outline must be submitted at various project milestones for monitoring.
— **Timeline:** Projects should have a timeline that fits within a one-year period from the time of application, ensuring prompt completion and measurable outcomes.
— **Language and Cultural Sensitivities:** Due consideration should be given to making the content universally acceptable, considering language options and cultural sensitivities.

3.7. Quality Assurance

Incentive Details Reimbursement of up to 30% of the costs incurred for obtaining certifications, capped at INR 5 lakhs; limited to 3 sanction per company during the policy period.

Eligibility Criteria:

— **Registered Companies:** Companies that are legally registered and are willing to adhere to international or national quality standards.

Types of Certifications (including but not limited to): ISO Standards, CMMI, Six Sigma, PEGI or ESRB ratings, WCAG, NASSCOM Gaming Forum Certifications, SIGGRAPH, UNITY or UNREAL Engine Certifications etc.

Requirements:

— **Audit Verification:** Companies must undergo an audit to validate adherence to the chosen quality standard.
— **Documentation:** Detailed reports that outline the quality measures taken, the certification aimed for, and the outcomes of any audits.
— **Implementation Plan**: A roadmap for achieving and maintaining the quality standards, with milestones and deadlines.
— **Training:** Evidence that staff have been or will be trained to meet and uphold these quality standards.
— **Monitoring and Reporting:** Periodic reports showcasing adherence to quality standards and audit results are required.

3.8. International Market Access

Incentive Details: Reimbursement of up to 40% of the costs incurred for participating in trade shows or expos, capped at INR 5 lakhs per company per year; limited to 3 sanction per company during the policy period.

Eligibility Criteria:

— **Registered Companies:** KAVGC Companies with at least one year of operation.

Types of Trade Shows or Expos (including but not limited to):

— **Gaming Expos:** Such as E3, GDC, or India Game Developer Conference
— **Animation and VFX Expos:** Like SIGGRAPH, Annecy International Animated Film Festival, or Effects America

— **Comic Conventions:** Such as San Diego Comic-Con, New York Comic Con, or the Indian Comic Con
— **AR/VR Expos:** Like VR World Congress, Augmented World Expo, or VRDays Europe

Requirements:

— **Portfolio:** Companies must have a portfolio of work to showcase at the event
— **Business Justification:** A business case for attending the event, including expected outcomes, and networking objectives
— **Estimated Costs:** A breakdown of the expected costs to attend, including booth setup, marketing materials, and travel
— **Eligible expenses:** Setting up of booth space, Airfare (economy class) and cost of Visa
— **Event Documentation:** Proof of registration and attendance, such as tickets and photos from the event

4. DEFINITIONS

4.1. General Terms

- **AVGC-XR Sector -** The AVGC-XR sector is represented by companies, joint ventures, focus groups, consultants and creative professionals engaged in the business of conception, production, post-production, media and intellectual property rights management, publishing and marketing of animation, visual effects, special effects, editing, digital game development including mobile, console, desktop games (excluding gambling) and comics content. They also actively promote the products and related services such as development of software research, development of AVGC-XR subjects, related technology, and its business management.
- **AVGC-XR Company** - Any company in the AVGC-XR sector as defined above.
- **KAVGC Company** - Any AVGC-XR company (as defined above), which is working out of Karnataka and registers with KBITS is referred as a KAVGC Company. Through this registration, the company becomes eligible to avail any incentives or subsidies mentioned in this policy.
- **Policy Period** – The duration for which this policy will remain enforced, either 5 years from the time this policy is launched or the launch of a newer policy that supersedes this policy, whichever is earlier.
- **ABAI -** It is an association originally started by and for Bengaluru Animation Industry was formed in 2006, is a non-profit association. It has since spread its wings to become a strong catalyst to promote the Animation, Visual Effects, Gaming, Comics and Extended Reality (AVGC-XR) business activities in India.
- **Animation -** Animation is the technology of displaying frames in succession to create an illusion of motion. Animation is used in entertainment, education, design, game development, simulations, etc. It is basically categorized into 2D traditional animation that is done manually by hand and 3D-digital animation that is done by using various software applications. It is finding its use in mobiles, software applications, movie visual effects, visual communication, and advertising.
- **Animation Entertainment -** Animation Entertainment includes animated movies, TV broadcast of animated cartoon series through 2D cell animation (using 2D bitmap or vector graphics), 3D CGI animation or 3D motion capture animation.
- **VFX -** Stands for Visual effects. It is the grouping of various processes by which imagery can be created without shooting for it live. It can also be used to enhance a live footage to exhibit sequences which is impossible or not feasible to shoot live.
- **VR** - Stands for Virtual Reality. It is an artificial environment that is created with software and presented to the user in such a way that the user suspends belief and accepts it as a real environment. On a computer, virtual reality is primarily experienced through two of the five senses: sight and sound.
- **AR -** Stands for Augmented Reality. It is the integration of digital information with the user's environment in real time. Unlike virtual reality, which creates a totally artificial

environment, augmented reality uses the existing environment and overlays new information on top of it.

- **MR** - Stands for Mixed Reality. It sometimes referred to as hybrid reality, is the merging of real and virtual worlds to produce new environments and visualizations where physical and digital objects co-exist and interact in real time.
- **XR** – Stands for Extended Reality. It encompasses a range of immersive technologies that merge the physical and digital worlds such as VR, AR, and MR.
- **Game** - A game is an electronic game that involves human interaction with a user interface to generate visual feedback and immersive experiences on a device that shall include 2D, 3D, video, handheld devices, mobile, virtual, console, etc. The online skill gaming industry can be categorized into – casual games, real-money games (fantasy sports, card games and other RMG games) and Esports.
- **Game Development -** Game development relates to development of video games, interactive games, simulation games, electronic games, mobile-based games, online games etc. Video Games are software applications that involve interaction with a user interface to generate visual feedback on a display device. Interactive games are used for entertainment, education (edutainment) and for non-entertainment applications such as serious games (games that are designed primarily to convey information or a learning experience of some sort) and simulation. The electronic systems used to play video games are known as platforms. For example, personal computers, video game consoles such as PlayStation, Xbox and Nintendo Wii, handheld consoles such as Nintendo Gameboy Advance, PlayStation Portable (PSP) and mobile devices such as mobile phones and iPhones. The Internet is also a platform for various forms of web-based games. For the purpose of clarity, gambling software applications are not a part of interactive games.
    - **Online** - Online games are played on the internet through web portals. These games range from basic single-player games to multiplayer online role-playing games (MMORPG). MMORPGs enable several players to simultaneously interact during a game on the Internet.
    - **Mobile** - These games are played on mobile telephone devices. Mobile games typically cost under INR 500 and are sometimes adapted from popular console or PC games.
    - **PC** - Games in this segment are played on a PC, which is usually upgraded with gadgetry such as an additional graphics card for an enhanced gaming experience.
    - **Console** - This segment of gaming requires a separate hardware known as a console that is loaded with the game's software. The main brands in this segment include the Sony PlayStation, Nintendo Wii, and Microsoft Xbox. Typically, a generation of console lasts for a few years, also called console cycles, and is upgraded or replaced by a new generation of gaming hardware and software.

- **Game of Skill**: A game whose outcome is predominantly determined by the knowledge, training, expertise, and experience of the participant.
- **Game of Chance**: A game whose outcome is not predominantly determined by the knowledge, training, expertise, and experience of the participant but it is determined by the chance and luck.
- **MMORPG -** Massively multiplayer online role-playing games. These are role-playing games where thousands of gamers play strategy or action theme-based games in a virtual and persistent end-user through the World Wide Web, by way of a web browser or other web-enabled software like internet television clients, micro blogging clients and RSS readers.
- **Comics -** The term derives from the mostly humorous early work in the medium and came to apply to that form of the medium including those far from comic. The sequential nature of the pictures, and the predominance of pictures over words, distinguishes comics from picture books. Comics are combination of cartoon with a story line, laid out in a series of pictorial panels across a page or a digital media and concerning a continuous character or set of characters, whose thoughts and dialogues are indicated by means of "balloons" containing written speech. The comic strip form can be employed to convey a variety of messages (e.g., advertisements, value education, entertainment, etc.)
- **Direct to DVD -** A film that is released direct-to-video (also known as made-for-video, straight-to video and straight-to-DVD) is one which has been released to the public on home video formats (historically VHS) before or without being released in movie theaters or broadcast on television.
- **SVOD -** Stands for Subscription Video on Demand. It refers to a service that gives users unlimited access to a wide range of programs for a monthly flat rate. The users have full control over the subscription and can decide when to start the program. They can also pause, fast forward, rewind and stop the show as preferred.

4.2. Terms Used in Animation

The production pipeline for Animated and Live action movies can be divided into three phases.

- **Pre-production:** Pre-production is the process of fixing some of the elements involved in a film. Many of the key elements such as principal cast members, director and cinematographer are set. By the end of pre-production, the screenplay is usually finalized. During pre-production, the script is broken down into individual scenes, storyboards and all the locations, props, cast members, costumes, special effects and visual effects are identified. An extremely detailed schedule is produced, and arrangements are made for the necessary elements to be available to the filmmakers at the appropriate times. Sets are constructed, the crew is hired, financial arrangements are put in place and a start date for the beginning of principal photography is set.

- **Production:** During the 'Production' phase, the movie is actually made. For live action movies, principal photography takes place, for animated movies actual process of modelling, animation etc. takes place.
- **Postproduction:** Post-production is many different processes grouped under one name. These typically include:
    - Writing, (re)recording, and editing the soundtrack
    - Adding visual special effects - mainly computer-generated imagery (CGI) in live action movie footage
    - Sound design, sound effects, ADR, Foley, and music, culminating in a process known as sound re-recording or mixing with professional audio equipment
    - Transfer of color motion picture film to video or DPX with a telecine and color grading (correction) in a color suite

  The post-production phase of creating a film usually takes longer than the actual shooting of the film and can take several months to complete because it includes the complete editing, color correction, and the addition of music and sound.
- **Idea/Story**: Story writer comes up with an idea. A story is written on the idea adding dramatic scenes, sequences, characters, themes etc.
- **Storyboarding**: A storyboard is a graphic organizer in the form of illustrations or images displayed in sequence for the purpose of pre-visualizing a motion picture, animation, motion graphic or interactive media sequence.
- **Animatic Review**: In animation and special effects work, the storyboarding stage may be followed by simplified mock-ups called "animatics" to give a better idea of how the scene will look and feel with motion and timing. At its simplest, an animatic is a series of still images edited together and displayed in sequence with rough dialogue (i.e., scratch vocals) and/or rough soundtrack added to the sequence of still images (usually taken from a storyboard) to test whether the sound and images are working effectively together. This allows the animators and directors to work out any screenplay, camera positioning, shot list and timing issues that may exist with the current storyboard.
- **Design**: In this stage look of the movie is designed. Designs of how the characters will look, how the world where the story takes place, how the sound is going to be, is decided. Design goes through multiple iterations until finalizing.
- **Layout**: Once the storyboards have been approved, they are sent to the layout department which then works closely with the director to design the locations and costumes. With this done they begin to stage the scenes, showing the various characters' positions throughout the course of each shot. Environment assets and camera are setup in each shot and flow of camera movement is decided.
- **R&D**: Depending on the theme/period of movie story, research is done to finalize the look of assets like clothes, architecture. These assets should make the look of movie more authentic.
- **Modelling**: 3D modeling is the process of creating a 3D representation of any surface or object by manipulating polygons, edges, and vertices in simulated 3D space. 3D modeling can be achieved manually with specialized 3D production software that lets

an artist create and deform polygonal surfaces, or by scanning real-world objects into a set of data points that can be used to represent the object digitally. All the 3D characters, assets, environment assets are created following the same process.

- **Texturing**: Texturing is the process of adding colors, texture, skin, etc. on the 3D models.
- **Rigging**: In its simplest form, 3D rigging is the process of creating a skeleton for a 3D model so it can move. Most commonly, characters are rigged before they are animated because if a character model doesn't have a rig, they can't be deformed and moved around.
- **Animation**: After the 3D models are rigged, animators add life to them by setting different poses. These poses follow a timeline. When played in sequence they look like an animating live character.
- **FX**: Special effects like fire, explosion, water flow, wind is added on top of character animation to give it a sense of realism.
- **Lighting**: In this phase lighting effects are added to the scenes. Ambient light, specular reflections and shadow effects create realistic environment for the shots.
- **Rendering**: Rendering or image synthesis is the process of generating an image from a 2D or 3D model (or models in what collectively could be called a scene file) by means of computer programs. A scene file contains geometry, viewpoint, texture, lighting, and shading information as a description of the virtual scene. The data contained in the scene file is then passed to a rendering program to be processed and output to a digital image or raster graphics image file. These image files collectively make a video file.
- **Compositing**: Compositing is the combining of visual elements from separate sources into single images, often to create the illusion that all those elements are parts of the same scene. At this stage all the different elements like animated characters, background, environment etc. are integrated together. Background is created in Matte Painting stage of production.
- **2D FX/ Motion Graphics**: At this stage special effects, texts, titles etc. are integrated with the shots.
- **Color Correction**: Depending on the mood of the scene, shots are color corrected. Life nighttime shots are given bluer tint, daytime shots are made more yellowish. Happy moments in movie are shown with bright and vivid range of colors whereas sad moments as shown with dull colors.
- **Final Output**: Finally, we get the final output as movie.

4.3. Terms Used in VFX Production

- **Story:** Story is written with multiple iterations overs scene, shots, and character development.
- **Story Board:** Story is converted to a set of drawings showing different instances in the story line.

- **Concept Art:** Concept arts are the drawings showing the look of the characters, sets, world where the story takes place.
- **2D Animatic:** A 2D animatic sequence is created out of the story board and concept arts to check the overall flow of the events in the story.
- **Assets Creation:** The 3D models of the characters, world, environment, clothes etc. are created in this stage. Other than computer 3D models, physical assets are created like weapons, antiques, and other items as per the story.
- **Modelling:** The 3D models created in assets creation phase are update with texturing and rigging to make them usable in the later stages.
- **UV\Texturing:** Texturing is adding colors or textures on top of 3D models. Animals, humans' 3D models are layered with skin, clothes like textures.
- **Rigging:** In this stage 3D models are added with skeleton structures to animate them. It is very much like adding strings on puppets. These skeletons are then used to add animation to them.
- **FX:** Special effects like explosions, storms etc. are created in this stage.
- **Matte Painting:** A matte painting is a painted representation of a landscape, set, or distant location that allows filmmakers to create the illusion of an environment that is not present at the filming location. Backgrounds paintings like dramatic, beautiful looking skies, mountains, cityscapes are created in this stage. They are used to enhance the world look of the movie.
- **Shooting Reference:** For special effects, real world reference videos are captured in this stage. They include shots on fire, animal movements, explosions, flying birds, smokes etc. These videos are then used as a reference to create computer generated special effects.
- **Shooting Live Action:** Life action videos of the movie, also called principal photography happens in this stage. These videos are shot with actual actors either at actual locations or inside studios.
- **Roto:** Rotoscoping (often abbreviated as "roto") has often been used as a tool for visual effects in live-action movies. By tracing an object, the moviemaker creates a silhouette (called a matte) that can be used to extract that object from a scene for use on a different background.
- **BG Prep:** Chroma key compositing, or chroma keying, is a special effects/ post-production technique for compositing (layering) two images or video streams together based on color hues (chroma range). The technique has been used heavily in many fields to remove a background from the subject of a photo or video – particularly the newscasting, motion picture and videogame industries.
- **Match Move:** In cinematography, match moving is a cinematic technique that allows the insertion of computer graphics into live-action footage with correct position, scale, orientation, and motion relative to the photographed objects in the shot.
- **Set Extension:** Digital additions to actual performing environments.
- **Lighting:** In this phase lighting effects are added to the scenes. Ambient light, specular reflections and shadow effects create realistic environment for the shots.

- **3D Live Animatic:** After all these effects are added, we get a 3D live action video.
- **Animation:** The 3D models of animals or monsters created to add an extra element of dramatization are animated in this stage.
- **3D Render:** Rendering or image synthesis is the process of generating an image from a 2D or 3D model (or models in what collectively could be called a scene file) by means of computer programs. A scene file contains geometry, viewpoint, texture, lighting, and shading information as a description of the virtual scene. The data contained in the scene file is then passed to a rendering program to be processed and output to a digital image or raster graphics image file. These image files collectively make a video file.
- **Compositing:** Compositing is the combining of visual elements from separate sources into single images, often to create the illusion that all those elements are parts of the same scene. At this stage all the different elements like animated characters, background, environment etc. are integrated together. Background is created in Matte Painting stage of production.
- **Final Render:** Finally, the videos are rendered to frames/images which collectively makes the movie.

5. GLOSSARY

AVGC	Animation, Visual Effects, Gaming & Comics
KAVGC	Karnataka AVGC
KBITS	Karnataka Biotechnology & Information Technology Services
ITeS	Information Technology Enabled Services
BPM	Business Process Management
BIAL	Bengaluru International Airport Limited
SEZ	Special Economic Zone
R&D	Research & Development
CAGR	Compound Annual Growth Rate
MoU	Memorandum of Understanding
VFX	Visual Effects
DAC	Digital Art College
DAS	Digital Art Symposium
SHLCC	State High Level Clearance Committee
SLSWCC	State Level Single Window Clearance Committee
MOOC	Massive Open Online Courses
IP	Intellectual Property
CG	Computer Graphics
PPP	Public Private Partnership
DBFOT	Design Build Finance Operate Transfer
FOF	Fund of funds
BTS	Build to Suit
TTT	Train the Trainer
SME	Small and Medium-sized Enterprises
PDV	Post Digital and Visual Effects
SVOD	Subscription Video On Demand
VR	Virtual Reality
AR	Augmented Reality
MR	Mixed Reality
AEB	Additional Economic Benefits
NSDC	National Skill Development Corporation
NSDA	National Skill Development Agency
SSC	Sector Skills Council
PF	Provident Fund
ESI	Employees State Insurance
KERC	Karnataka Electricity Regulatory Commission

**"Most of the old cities represent the past of India.
They represent history, whereas
Bengaluru represents the future that we are moulding..."**

Pandit Nehru on his visit to Bengaluru

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