gamevironments

Gamevironments from the perspective of an actant. ChatGPT (prompt: "gamevironments").

10th Anniversary Issue

Gamevironments Revisited

Issue 21 (2024)

reviews

Gamevironments Revisited from the Perspective of Game Production Studies[i]

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Abstract
The original concept of gamevironments, introduced by Radde-Antweiler, Waltemathe, and Zeiler in 2014, was an actor-centered approach to video game research that integrated the analysis of games as digital artifacts with the broader cultural and social context in which these games were produced and consumed. In this issue, Radde-Antweiler (2024) revisits the concept, calling for a holistic actant-centered approach that takes not only the human, but also the non-human actors into consideration. While the revisited concept of gamevironments is a useful approach to studying video games, it still largely omits the economic dimension of producing and consuming video games in different cultural, economic, and political backgrounds. This article aims to bridge this gap and analyze the 21st century video game industry through the lens of political economy and game production studies, aiming at integrating these perspectives with the analytical framework of gamevironments. The economy and global financial flows make up an important part of the analysis of video game development, and it is important to consider the economic dimension of video game production and consumption in different contexts. The video game industry is shaped by concerns around profitability, and the oligopolistic power of corporations has a significant impact on the cultural production of video games in terms of which projects get funded and marketed to global audiences. Additionally, the politics of the video game industry and the sociopolitical issues within the game culture discourse are important topics that need to be investigated. In this article, we identify ten key challenges for studying video games and game culture using the revisited gamevironments approach that game production studies can help in addressing.

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The video game industry is a major economic force, generating billions in revenue annually. Yet, its economic impact reaches far beyond generating profits. Although it focuses on creating virtual worlds, the video game industry provides real jobs and growth for national and regional economies. At the same time, governmental policies, subsidies, and regulations interfere with the creative visions of video game designers and developers and fundamentally influence how games are created and consumed in different cultural and political contexts. As a result, the economy and global financial flows make up an important part of the analysis of video game development, and it is important to consider the economic dimension of video game production and consumption. The video game industry is shaped by concerns around profitability, and the oligopolistic power of corporations has a significant impact on the cultural production of video games in terms of which projects get funded and marketed to global audiences. Additionally, the politics of the video game industry and the sociopolitical issues within game culture discourse are important topics that need to be investigated.

In 2014, Radde-Antweiler, Waltemathe, and Zeiler introduced the concept of gamevironments into the field of game studies. The original concept focused on actor-centered approach and integrated the analysis of video games as digital artifacts with the broader cultural and social context in which these games were produced and consumed. In this issue, Radde-Antweiler (2024) revisits the concept, shifting the emphasis towards actants, including non-human ones, rather than actors, while integrating research on gaming, gaming-related actants, and on gaming-related media practices into a more holistic frame. While the revisited concept of gamevironments is a promising approach to studying video games and gaming, it still largely omits the economic dimension of producing and consuming video games in different cultural, economic, and political backgrounds.

This article aims to bridge this gap and analyze the 21st century video game industry through the lens of political economy and game production studies, aiming at integrating these perspectives with the analytical framework of gamevironments. In the following text, we identify ten key challenges for studying video games and game culture using the gamevironments approach that game production studies can help in addressing. These challenges include production limitations, non-human production, market considerations, monetization, publishers and cultural intermediaries, platforms, relations with players, working culture, state support and regulations, and localization.

Overall, this article aims to illustrate how game production studies can enrich the analytical concept of gamevironments and broaden our set of research tools and methods for understanding the role video games play in an interconnected world of different local settings and global economic and cultural interdependencies. At the same time, the article can serve as an inspiration for production studies scholars interested in addressing topics that emerge at the intersections of production issues and the gamevironments framework. The circumstances and practices of production influence many other parts of game artifacts and game cultures. Tracing these relationships and analyzing them can extend the reach of game production studies at the same time as enriching the gameviroments framework.

Theoretical Background

Gamevironments
The gamevironments framework, put forth by Radde-Antweiler, Waltemathe, and Zeiler in 2014, provided a theoretical and analytical lens grounded in an actor-

centered perspective. It integrated the study of video games as digital artifacts within the wider cultural and social contexts surrounding their production and use. The framework contained two levels: (1) the technical environment of video games and gamers, and (2) the socio-cultural environments of video games and gaming. As a whole, gamevironments was a theoretical and analytical concept that aimed to maintain the cultural, political, religious and social aspects of game content while taking "the performative aspects and ludic interaction into account" (Radde-Antweiler, Waltemathe and Zeiler 2014, 8).

In this special issue, Radde-Antweiler (2024) revisits the original concept of gamevironments, calling for a more holistic actant-centered approach that would take not only the human but also the non-human actors into consideration. According to her, we are now living in a *deeply gametized* society where digital games intertwine with political, social, and religious realities rather than merely reflecting them. While the original concept of gamevironments aimed to place the entire gaming environment under scrutiny, including various levels of involved actors, their media practices, and the different media formats, the revisited concept of gamevironments shifts focus from human actors to an actant-centered approach (Latour 1996), which considers both human and non-human elements such as hardware, software, and data traces. As Radde-Antweiler (2024) argues, the traditional separation between the technical and cultural environments of video games is outdated; these elements are interwoven and collectively form actants that facilitate communicative practices. Gamevironments, therefore, can be analyzed as communicative figurations encompassing communicative practices, the constellation of actors, and thematic framing. Researching gamevironments thus requires a perspective that includes gaming, gaming-related actants, and gaming-related media practices comprehensively, beyond merely the games, players, and developers.

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Nevertheless, like its predecessor, the revisited gamevironments framework still largely overlooks the role of economics in video game production and use, focusing more profoundly on social, political, cultural, and religious aspects of gaming. Attempts have been made to address this gap by analyzing the 21st century video game industry through a political economy lens and integrating this perspective with the gamevironment framework (e.g., Hammar 2020, House 2020, Šisler 2023). In particular, Šisler (2023) emphasized the crucial role of economic and financial flows for analyzing gaming cultures and introduced a refined conceptualization of gamevironments that incorporates political economy.

In this article, we build upon the above-mentioned efforts and aim to connect the revisited concept of gamevironments and the actant-centered approach it offers with game production studies. By doing so, we situate gaming and game production within their economic, political, and sociocultural conditions, including market trends, cultural values, politics, economics, and developmental/receptional influences. This critical perspective aims to understand video games and gaming as multidimensional systems situated within and shaped by diverse spheres of life. The goal is to analyze games not merely as cultural products, but as complex interplays between narratives, aesthetics, computations, designs, interpretations, and societal and economic embeddings. As Radde-Antweiler (2024, 7) notes, "digital games are not simply historical reflections of a political and social – or religious – reality that exists separately from them. They are themselves components and motors of this reality; they communicate and construct world views." Today, this notion is nowhere as valid as in the intersections between gaming, economic conditions, market trends, and digital labor in the globalized world. Moreover, in cases of economy and labor, video games and their development do far more than "communicate and construct world

views" (ibid.) – they fundamentally shape the reality of millions of people working in the industry.

Game Production Studies

Game production studies is a methodological perspective that emphasizes the production circumstances of video games (Sotamaa and Švelch 2021a). Its goal is not necessarily to create a new field in opposition to previous areas of interest in game studies, but to bring together various scholarly directions that have addressed matters and conditions of production. Inspired by the production studies movement in film and television studies (Caldwell 2008, Mayer, Banks, and Caldwell 2009), game production studies highlights the shared concerns of previous traditions such as the macro analysis of the video game industry (Kerr 2006, 2017), political economy of games (Nieborg 2014), platform studies (Montfort and Bogost 2009), video game historiography (Nooney 2013, Guins 2014, Švelch 2018), research on independent games (Garda and Grabarczyk 2016, Ruffino 2020) or game co-creation (Kücklich 2005, Grimes and Feenberg 2009). All these approaches to the study of games have dealt with production, but often have done so in their separate corners of the overarching discipline of game studies. The goal here is to draw attention to game production as a key area of game studies next to the existing strong traditions of game analysis and player studies. Production often influences how games are created and what content makes it into them as well as then how players engage with it due to the matters of distribution or monetization.

Beyond acknowledging these implications of production for other aspects of games and game culture, game production studies also addresses core issues of video game production such as precarious labor conditions (Weststar and Legault 2019, Cote and Harris 2023), discrimination in the workplace (Harvey and Shepherd 2017, de Castell

and Skardzius 2019), business models and monetization strategies (Nieborg 2021, Van Roessel and Švelch 2021), and platforms and game development tools (Whitson 2018, Foxman 2019, Thorhauge 2023, Malazita 2024). Another key mission of game production studies is to acknowledge the multiplicity of the game industry and the lack of one unified practice of game development despite the strong position of global distribution platforms. This is achieved through analysis of local production cultures (e.g., Jørgensen, Sandqvist and Sotamaa 2017, Keogh 2019, Minassian and Zabban 2021, Nakamura and Wirman 2021, Ozimek 2021) and the plurality of approaches across various sectors. In this sense, game production studies both pays attention to "specific sites and fabrics of media production as distinct interpretative communities" (Banks, Conor and Mayer 2016, x) as well as "the social and economic conditions within which [developer] agency is embedded" (Sotamaa and Švelch 2021b, 13).

Since the publication of the edited collection *Game Production Studies* (Sotamaa and Švelch 2021a), this area has been steadily growing, answering new challenges like automation in game production (Chia 2022a), covering so-far overlooked regions and countries (Chen, McAllister and Ruggill 2024) as well as further developing the underlying arguments about the multiplicity of game industries and other modes of production (Keogh 2023). The production context is also receiving a lot of interest in media, both the specialized press and more mainstream news outlets (Nieborg and Foxman 2023), following reports of workplace harassment and most recently the 2023 and 2024 waves of layoffs.

In the following text, we analyze particular challenges of video game development that can illuminate the ways in which game production studies perspective can enrich the revisited framework of gamevironments, on all the three layers proposed by

Radde-Antweiler (2024), i.e., gaming, gaming-related actants, and gaming-related media practices. These ten challenges are based on a literature review of recent game production scholarship as well as the observations from journalistic and trade publications by the two authors. They are ordered based on their relative proximity to the core activity of game production as represented by a video game studio and in-house development, progressing outward to consider also the role of cultural intermediaries and other actors and actants that are part of the broader game production network. There is no clear hierarchy or priority among the challenges.

Challenges

1. Production Limitations

Video game content is shaped by production limitations of both technological and cultural origin. Regarding the former, current game development pipelines impose a specific workflow based on their internal programming logics. Following the rise in popularity of commercially available engines in the 2000s and 2010s as a way of lowering the costs of production using the ready-made game-making tools, namely Unity (Nicoll and Keogh 2019) and Unreal Engine (Chia 2022b, Malazita 2024), many contemporary game titles share the same underlying technology. The use of game engines is also common in non-commercial video game production. Here, the abovementioned Unity is complemented by simpler tools like Ren'Py, RPG Maker, or Twine (Harvey 2014, Fiadotau 2019, Consalvo and Staines 2021). This can arguably lead to homogenization of game assets and mechanics. For example, Unreal Engine 3 was known for its difficulty of handling truly destructible environments, thus making the developers fake actual destruction of game geometry with textures that, for example, showed bullet holes and thus created a sense of destruction while the

underlying game geometry remained unchanged. Perhaps more importantly, the practical limitations of game engines can result in a lack of diversity in game characters or game objects more broadly (Smith 2016, Harper 2020). The way many engines are set up, it is easier to switch textures (or so-called skins) than to entirely swap out or modify 3D models, which require additional labor in terms of rigging and animation. This can lead to a lack of representation for diverse body types. The same infrastructure could technically allow for more inclusive representation of skin color, which is easier and thus cheaper to implement from the development perspective. Asset stores for game engines like Unity (Foxman 2019) add to these representational issues by offering ready-made assets that are likely to omit specific cultural markers and instead contribute to transnational imaginary (Vanderhoef 2021).

The cultural limitations are caused by the homogenous demographics of the video game industry (see also challenge 2. Working Culture). Statistics show that the developer workforce is dominantly white, male, and young. This can again lead to the reinforcements of stereotypes, whether they are gender roles or orientalism of non-white cultures (Srauy 2019b, Tompkins and Martins 2022). However, these structural problems can be mitigated through use of sensitivity or cultural consultants from cultures that are represented in the games, but not among developers. This type of consultant-oriented model is becoming more common in video games (LaPensée 2021) and analog games (Grace 2021).

Integrating insights from game production studies into the revisited concept of gamevironments reveals how both technological and cultural production limitations shape game content, such as the standardization brought by popular game engines like Unity and Unreal, or demographic homogeneity within the game industry. These production constraints underscore the importance of considering non-human actants

like software and hardware, as well as cultural practices. Radde-Antweiler's (2024) approach, which moves beyond actor-focused studies to include hardware, software, and data traces as significant actants, aligns with the recognition of these production elements. By bridging these areas, we can develop a more nuanced analysis of gaming environments that acknowledges how production technologies and cultural contexts collectively influence game dynamics and communicative practices in a deeply gametized society.

2. Working Culture

The video game industry has a long history of labor exploitation dating back to the 1970s and Atari's internal policy against individual authorship (Montfort and Bogost 2009, Švelch 2022). These issues have grown even more pronounced with the institutionalization of crunch (prolonged overtime work) as the habitus of game production (Cote and Harris 2021). Moreover, this habitus extends even to production outside of the mainstream industry, as self-exploitation has been noted as an issue even in independent production (Keogh 2021). The working culture not only affects the lives and well-being of developers, but it also shapes the demographics of the workforce and the content and technical quality of games.

The precarious working conditions are hardly sustainable in the long term and thus the employment in the video game industry attracts primarily young men, who have fewer caregiving duties or can offload them (Chess 2013). The composition of game development teams influences the themes of games and contributes to the general lack of diverse representation. However, a certain maturing of the industry can be observed on game design trends such as *dadification*, which corresponds with parenthood of lead game creators, but it is still skewed toward men as the dominant group (Voorhees 2016, Stang 2017). We have discussed some of these cultural

impacts of the demographic makeup of the industry in the section on production limitations.

Crunch and publisher-set release dates also have a more practical effect on the technical quality of games or the amount of in-game content. Retrospective accounts of game development often explain the poor technical state of a game on its launch by the lack of time and resources to properly finish production (Petrillo et al. 2009, Schreier 2017). Working culture can thus also affect reception of games, such as with *Cyberpunk 2077* (2020), which was missing several promised features on launch and also suffered from technical issues (Siuda et al. 2024). These problems resulted in a poor initial reception of the game, which was salvaged over time with post-release support.

Working culture and labor practices within the industry shape not just the lives of developers but also the content, quality, and cultural impact of games. The institutionalization of crunch and the resulting demographic skew toward young men not only affect developers' well-being but also influence game themes and representation, often leading to a lack of diversity. These labor dynamics are non-human actants that intertwine with technical and cultural elements, impacting game development timelines, feature completeness, and technical quality.

3. Non-Human Production

Artificial intelligence (AI) has seen immense progress in recent years. Regarding video games, Yannakakis and Togelius (2018, 4) have argued that AI has been helping games to get better on several fronts: "in the way we play them, in the way we understand their inner functionalities, in the way we design them, and in the way we understand play, interaction and creativity." Indeed, the gaming industry is using AI in

all levels of video game development, from brainstorming, script writing, and producing audiovisual assets, to coding, testing, and marketing. Yet, as Chia's (2022a) analysis of discourses around procedural content generation (PCG) demonstrates, the automation of creativity in the games industry might come with a cost. The caveat is not necessarily job loss per se, but the "constitution of an underclass of artists whose vital work of conditioning algorithmic outputs is denigrated as derivative and 'manual'" (Chia 2022a, 389). As she argues, PCG pipelines are organized less around the agency of human designers and more around the autonomy of systems that assimilate tasks in the management of complex networks of dependencies. As a result, creative work "is reserved for artists with technomasculine forms of cultural capital; mechanical tuning is relegated to automatable and outsourced labor and relies on replicable technique that is considered artistic but not creative" (ibid.).

AI and PCG have a significant impact on video game production and consumption. Generative AI is expected to have an overarching effect on video game production pipelines. AI can help developers be more productive, accelerating game creation and complementing workflows, while reducing the time and budget required for the development. However, AI and PGP might increase the precarization of vulnerable positions in gaming industry, particularly junior artists, programmers, and testers. While game production studies (Chia 2022a) highlight the intricate interplay between human creativity and algorithmic automation, pointing to the potential marginalization of manual creative labor, the actant-centered approach (Radde-Antweiler 2024) emphasizes the interconnectedness of human and non-human actors. This view acknowledges the complexities and dependencies within game production pipelines and includes the broader constellation of actants influencing communicative practices.

4. Monetization

The way games are commodified impacts their game design as well as the available game content. Various monetization strategies lend themselves toward certain types and genres of games. The most basic distinction can be made between *games as products* and *games as services* (Dubois and Weststar 2022). The former establishes a short-term relationship between developers and players through a one-time purchase, while the latter is based on a continual value extraction from players, whether it is money acquired through microtransactions and paid subscriptions or data collected by instruments of player surveillance (Švelch 2024). These monetization strategies support different types of games and monetization. Specifically, in freemium games, monetization is understood as interlinked with game design (Van Roessel and Švelch 2021).

Cosmetic items in games with microtransactions can also affect matters of representation, effectively commodifying non-hegemonic representation with the so-called premium skins. Previous research in this area has shown that people of color can feel incentivized, and in fact often spend more money, on skins that relate to demographics and cultures not represented in the default skins provided by the developers for free (Reza et al. 2022).

Additionally, monetization and the financial viability of games is influenced by the broader context of game culture. Specifically, livestreaming and playthrough videos can both promote and harm economic prospects of certain games. Previous research has shown the positive effects on multiplayer titles from the games as service category (Johnson and Woodcock 2019). Whereas premium (games-as-products) titles with short playing times have suffered from the easy accessibility of playthrough footage (Parker and Perks 2021). Story-driven independent games seem to be

particularly affected as the developers of *That Dragon, Cancer* (2016) have themselves publicly acknowledged (Green 2016).

Monetization and connected economic strategies shape both the design and reception of video games. Monetization techniques influence game content, player engagement, and even representation, as seen with the commodification of non-hegemonic cultural skins. These economic factors act as non-human entities that impact how games are experienced and interpreted within societal contexts, while intertwining with the technical and cultural fabric of games.

5. Audience and Market Considerations

Cultural industries are acutely self-aware and adjust their self-presentation based on their understanding of the market and audiences. This so-called *industrial reflexivity* (Caldwell 2008) manifests in various messaging around the products, such as making-ofs or behind-the-scenes narratives, but it can also affect business strategies. For example, video game monetization, which can be a highly controversial topic among players and in the specialized press, is understood by industry practitioners as a sensitive subject, resulting in careful and curated communication regarding things like microtransactions or loot boxes (Perks 2021, Van Roessel and Švelch 2021). For example, CD Projekt used free DLC for *The Witcher 3: Wild Hunt* (2015) to distinguish itself among other video game companies pursuing more aggressive monetization. For *Apex Legends* (2019), the chosen freemium monetization model resulted in atypical release schedule – to limit bad press regarding the game's implementation of microtransactions the game was announced only a few days before its release, thus limiting the for negative buzz (Van Roessel and Švelch 2021). Industrial reflexivity thus becomes both a buffer and an interface for industry-audience negotiations about these salient topics.

The notion of so-called apolitical games falls into this category as a discursive strategy to reach the widest possible audience by avoiding political interpretations of games and their narratives. This strategy can be illustrated by the representation of religions in video games. For example, the strategy game series *Civilization* (2005) introduced several world religions in its fourth installment. It enables players to found these religions, build the religions' holy sites, and spread the religions through missionary work. Yet, all the religious systems available to the player – Buddhism, Hinduism, Judaism, Christianity, Confucianism, Taoism, and Islam – are procedurally equal and presented in a supposedly neutral way (Šisler 2014). From the games' developers' statements, it is clear that they strove to be religiously sensitive, while maintaining challenging and balanced gameplay. As they say, "we offer no value judgments on religion; we mean no disrespect to anyone's beliefs. We're game designers, not theologians" (Firaxis Games 2005).

The focus on industrial reflexivity and market considerations highlights how industry dynamics and strategic communication shape the broader game ecosystem. The understanding of how developers cater to market demands and sensibilities exemplifies the interplay between market strategies and product reception. Again, this reflexive approach underscores the importance of non-human actors, such as marketing strategies and economic considerations, which are central to the actant-centered approach of revisited gamevironments.

6. Localization

The transition from translation to localization began in the 1980s within the IT industry, eventually being adopted by the gaming sector (O'Hagan and Mangiron 2013, Šisler et al. 2023). Unlike mere translation, localization involves a more extensive strategy focused on enhancing user experience, which includes various

design decisions. Localizers adapt foreign cultural products for domestic consumption while also modifying them for a global audience (Carlson and Corliss 2011). Known by the industry acronym GILT (globalization, internationalization, localization, translation), localization's scope is extended beyond translation to encompass globalization and internationalization as well (\). For instance, Japanese companies such as Square Enix have successfully utilized internationalization processes to develop games that are globally accessible yet retain distinctively Japanese elements (Consalvo 2013). A similar approach is evident in the *Witcher* series, which balances local cultural features with international accessibility, particularly concerning Polish references (Majkowski 2018).

In many cases, localization requires more than linguistic translation, but also an adaptation to cultural, religious, and political context. In cases of localizing US and European video games for the Arab market, this entails "avoiding overt depictions of sexuality, explicit violence, criticism of religion, and alcohol consumption" (Šisler, de Wildt and Abbas 2023). Thus, an important aspect of localization is compliance with varying national regulations, oftentimes reflecting cultural sensibilities related to history, religion, ethnicity, and geopolitics (Carlson and Corliss 2011). For example, Nazi symbolism in games has been problematic in Germany (Chapman and Linderoth 2015). The German Criminal Code prohibits of the "use of symbols of unconstitutional organizations" outside the contexts of "art or science, research or teaching" (Pfister and Tschiggerl 2020, 54). Since video games were not considered any of the latter, the Germany's entertainment software self-regulatory body USK effectively blocked games containing swastikas and other Nazi symbols from obtaining a rating and thus prevented them from being released in Germany. Video game companies developing historical games about WW2 either avoided German market or created a specific so-called clean version of their games, which raised the development costs and,

simultaneously, presented the horrors of Nazism without showing their perpetrators and naming their ideology. The situation has changed in 2020, when two games (*Through the Darkest of Times* (2020) and *Attentat 1942* (2017)) featuring Nazi symbols received USK ratings, signaling a policy change regarding the law's application.

In sum, localization and internationalization entail complex processes that reach beyond economic considerations and fundamentally shape the ways games are designed, developed, and consumed in different settings. In line with the actant-centered approach of revisited gamevironments, it helps us analyze how global and local cultural dynamics interweave with technological and regulatory factors.

7. Publishers and Cultural Intermediaries

It is important to acknowledge that the video game industry is made up of various types of actors at different levels. Developers are only one part of the larger ecosystem of the game industry, which involves publishers (Nieborg 2021), platforms (more on this topic in the next challenge) (Thorhauge 2023), outsourcing partners (Ozimek 2019) as well as different types of cultural intermediaries such as game conventions and festivals (Juul 2019), co-working spaces (Browne and Schram 2021), or arguably also the specialized press, which is closely tied to the industry (Fisher and Mohammed-Baksh 2020, Perreault and Vos 2020, Nieborg and Foxman 2023). All these different stakeholders affect game production and game culture more broadly and their impact should be considered when applying wide analytical frameworks like gamevironments.

To be more specific, publishers have historically wielded a lot of power in the game industry by determining which projects get picked up and funded. They have also

contributed to the risk-averse logic of mainstream AAA production through its focus on serialized franchises and brands (Denson and Jahn-Sudmann 2013, Nieborg 2014, 2021). The influence of publishers can thus be seen in the reluctance of major studios to create new intellectual properties and on the rapid release schedules of annualized franchises like *Call of Duty* (2003-2024). Publishers have also become an important force in indie game production, which initially started as a reaction against the creative oversight of traditional game publishers (Lipkin 2013, Garda and Grabarczyk 2016). Companies like Annapurna Interactive (Parker 2020) and Devolver Digital (Vanderhoef 2020) have taken the role of key curators in the crowded space of independent games, reportedly allowing for more creative autonomy, but still featuring heavily in the promotion of the games they publish. These so-called boutique publishers shape which games get the recognition in the specialized press due to strong marketing infrastructure that they can provide to smaller development teams, which might otherwise struggle to reach their audiences (Lipkin 2019, Whitson, Simon and Parker 2021). The potential benefits of publishers have been also noted in the mobile gaming market, which is otherwise usually considered to have a lower entry barrier and thus should technically allow for self-publishing (Broekhuizen, Lampel and Rietveld 2013).

In the context of indie games, festivals like IGF (Independent Games Festival) or IndieCade and their official competitions have shaped the style of this type of video games, bridging production logics and aesthetics (Juul 2019). These events are relevant for understanding how design trends are established and then supported by these cultural intermediaries. On a hobbyist level, game jams (and their organizing bodies) are also relevant in this respect, especially regarding their problematic relationship to crunch given the time constraints under which game jam participants create their games (Kultima 2021, Aurava and Meriläinen 2022). Educational

institutions offering game design and game development programs can be also understood as important actors in this space and they too often perpetuate harmful conditions of the mainstream industry (Harvey 2022).

The perspective of game production studies focusing on publishers and cultural intermediaries can enhance the revisited gamevironments framework by emphasizing the influential role these actors play in shaping game production, culture, and broader communicative practices. Publishers, with their significant control over which projects get funded and their tendency toward risk-averse, franchise-driven strategies, impact not only the kinds of games that are produced but also how they are marketed and received. Similarly, cultural intermediaries like game conventions, festivals, and the specialized press serve as critical nodes in the ecosystem, curating and promoting specific game aesthetics and trends.

8. Platforms

Platforms are another key part of the video game ecosystem. Historically, the term referred to gaming hardware as an important factor in what games are developed for a given system due to technological options and limitations and how players can then interact with the system and the games released for it (Montfort and Bogost 2009). The *Platform Studies* book series from MIT Press emphasized the often-overlooked role of hardware in game culture, at least at that stage of game scholarship in the 2000s. Developments in online connectivity and network infrastructure have contributed to a change in the meaning of the term platform, which is now associated with digital distribution channels and is no longer limited to one hardware standard. In this respect, Steam, Apple's App Store, and Google Play all rank as notable gaming platforms alongside traditional console ecosystems of

PlayStation, Nintendo, and Xbox. Platform-like qualities have also been observed in game engines, which we have already discussed.

In terms of platforms, it is important to acknowledge their impact on game content. The hardware specifications play a role in this, but contemporary platforms also shape the markets through recommendation systems and various content policies or the lack thereof (Nieborg, Young and Joseph 2020, Thorhauge 2023). Platforms contribute to the so-called cultural formatting based on what types and categories of content perform well within their ecosystem (Poell, Nieborg and Duffy 2021). The available features of platforms also structure the relationship between producers and audiences, for example, in the case of Steam user reviews, which are seen as highly important for a game's success on the platform (Werning 2019).

9. Relations with Players

On a technological and structural level, developers and publishers possess both hard and soft power to control what players do in games. They can ban cheaters (Consalvo 2007) or patch the game to make audiences comply with their envisioned way of play (Švelch 2019). Despite their disadvantageous position, players can, however, exert some pressure on the developers although they are often forced to act outside the games themselves. These acts of resistance are often toxic and harmful (Murphy 2014), but can still influence developers' actions (Švelch 2019). The *Mass Effect* trilogy (2007, 2010, 2012) is a famous example of a fan campaign that has resulted in a change to the final game in the series after players were left disappointed by the original endings (Burgess and Jones 2017, Reardon, Wright and Malone 2017). The changes to *Star Wars Battlefront II*'s (2017) monetization strategy have also been arguably caused by fan uproar (Perks 2021). These examples show the importance of acknowledging the complex dynamics of developer-player relationships, which go

beyond the more obvious forms of co-creation in games like *LittleBigPlanet* (2008) or *Roblox* (2006) (Grimes 2015) or modding (Sotamaa 2010, Kretzschmar and Stanfill 2019). User reviews on platforms like Steam can be one of the ways to stage a player protest. Especially since these interactions happen outside of games it is important to not overlook them and identify their impact on games as well as developers. Given the rising importance of data analytics in video game development (Egliston 2024, Sotamaa, Tyni and Myöhänen 2024), players shape the production and content of games in less obvious ways. This is not a deliberate influence, but rather a profit-driven optimization and exploitation of player data (Švelch 2024).

Analyzing relations with players sheds light on the complex, often contentious, dynamics between players and developers. Developers and publishers wield considerable control over the gaming experience through mechanisms like patching games or banning players, yet players also exert influence through external channels, including fan campaigns and user reviews. The latter highlights the powerful role players play in shaping game content and policies. Integrating these insights into the actant-centered approach of gamevironments allows for a richer understanding of how gaming ecosystems are co-constructed through the interactions of various human and non-human actors, such as player resistance, digital platforms, and developer strategies.

10. State Support and Regulations

A growing number of local governments began to recognize the cultural, technological, and economic potential of creative industries, including the gaming industry. For example, the Australian Games Production Fund provides grants to support the development of original, Australian, independent games. Support can also happen on a local level, for example, the Australian state of Victoria has been

active in this regard, attracting a lot of developers from the whole country (Keogh 2023). In the Arab world, such supportive programs include the King Abdullah Development Fund running Jordan Gaming Lab and Pocket Gamer Connects Jordan, the Information Technology Institute in Egypt, or Game Changers Program in Saudi Arabia. In addition to funding, these programs provide networking and entrepreneurship support, critical factors for success or failure of the gaming industry (Šisler, de Wildt and Abbas 2023). In the same vein, the Iranian government established the National Foundation of Computer Games (later renamed to Iran Computer and Video Games Foundation) under the supervision of the Ministry of Cultural and Islamic Guidance in 2006. The aim of the foundation is twofold: first, to boost economic growth in the video game industry segment; and second, to subsidize the development of games in Iran, that is those conceived in accordance with Iranian and Islamic values (Šisler 2013).

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The local governmental support can go hand in hand with state regulation and control over the content of locally produced video games. In 2016, Saudi Arabia's General Commission for Audiovisual Media implemented the region's first official age rating system for domestic and imported video games. Prohibited content includes nudity, explicit sexuality, homosexuality, religious criticism, and politically controversial material. In 2018, the UAE followed suit with the National Media Council introducing a similar system. According to press sources, it "aims at preserving the values of the UAE society and its cultural heritage, and at protecting children from the negative influences from various media platforms, including video games" (WAM 2018). These emerging regulatory frameworks impact not only local production but also localization and cultural adaptation of foreign titles (Šisler, de Wildt and Abbas 2023). Companies undertaking localization must account for concerns over foreign games' potential influence on national identity, gender norms, and moral values.

Similarly, the Iran Computer and Video Games Foundation and the Ministry of Cultural and Islamic Guidance implement a complex regulatory framework over the domestic Iranian video game production.

In other words, state support fosters the growth and sustainability of local game development, impacting the diversity and cultural specificity of game content. Concurrently, regulatory measures, such as age rating systems and content controls, influence both local production and the localization of foreign games, embedding national values and norms into the gaming experience. These governmental interventions act as powerful non-human actors within the gamevironments framework, interweaving with technological and cultural elements to shape the political, social, and religious realities within which games are produced and consumed.

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Concluding Remarks

This article has proposed integrating game production studies and political economy perspectives into the revisited analytical framework of gamevironments. It identifies ten key challenges of contemporary video game development that illustrate the importance of examining economic and production conditions.

Overall, the analysis shows how financial considerations and constraints profoundly shape game design, mechanics, narratives, representation, and technical aspects of games. The industry's economic agenda encourages formulaic content (Vanderhoef 2021), exploitative labor practices (Cote and Harris 2021), and various predatory monetization strategies that negatively affect gameplay and game content (Reza et al. 2022). Meanwhile, regional policies and differences manifest through development

infrastructure (Keogh 2023), content regulations (Pfister and Tschiggerl 2020, Šisler, de Wildt and Abbas 2023), and localization processes (Pyae 2018, Šisler et al. 2023).

Situating video games amidst these multilayered sociotechnical systems reveals the cultural formatting powers of platforms, publishers, and intermediaries. Their roles as gatekeepers and tastemakers contribute to risk aversion and creative constraints (Nieborg 2014, 2021). However, indie, alternative, and non-Western productions partially counter such forces by expanding thematic diversity and distribution models (cf. Srauy 2019a).

In summary, the revisited gamevironments framework that incorporates game production studies perspective enables more holistic, contextualized analysis of games not only as sociocultural artifacts but as complex ecosystem encompassing economic conditions, digital labor, and marketing trends. It highlights the interconnected nature of aesthetics, computations, interpretations, economics, and politics in constructing interactive experiences. Further studies can build upon these perspectives to deepen cross-disciplinary understandings of games across humanistic, social scientific and industry-focused approaches. More attention to production ecologies and constraints will enrich game scholarship and better inform discussions around ethics, justice, and innovation policies in the gaming sector.

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