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Digital platform ecosystems: user interaction on Twitch

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Contents

1- Introduction

Digital platforms have transitioned from mere facilitators of transactions and services to essential elements in the global economy with outsized influence and power to shape socioeconomic realities. The first part of this paper presents a comprehensive review of digital platforms in academic literature, offering the necessary lens to analyze the case study that follows. The paper proceeds to provide an in-depth analysis of Twitch as a digital platform by deconstructing its design elements, outlining the historical context of its creation and reasons for its success and growth. Twitch was chosen for the emergent dynamics brought forth through the convergence of livestreaming and active viewer participation, as well as the ecosystem supplementing it. A survey of interaction and viewing habits on Twitch is conducted to refine the understanding of consumer participation on the platform. The paper concludes with recommendations and best practices for companies and entities entering the Twitch sphere.

2- Digital Platforms

I. Technical and non-technical frameworks

A systematic literature review of digital platforms found a multitude of differing interpretations of the model in the academic field, with technical and non-technical frameworks forming the primary distinction (Asadullah et al., 2018). Technical definitions conceptualize a building block framework facilitating further functionality, while non-technical definitions highlight network effects and emphasize the role of participants. Elaborating on their technical definition, Baldwin and Woodard (2009) posit that "a platform architecture partitions a system into stable core components and variable peripheral components". Their approach examined the convergence of architecture and design in platforms by contrasting the interior of a core system with its interface. The interface, despite being powered by the interior, is the essential unit because it governs the interaction of a system's different components. Consequently, the interface tends to be stable with clearly defined functions while its components are allowed to interact and evolve to enable value-creation. Reuver, Sørensen, and Basole (2018) make the case that no single entity can lay claim to or control the core functions of a digital platform's distributed system. They point to an architecture emerging from a

blend of modular hardware with layered software as being more dynamic, distributed, and ultimately leading to innovative creations by developers. Moreover, they distinguish between technical and organizational frameworks of digital platform ecosystems, as technical frameworks focus on third-party complementary apps to core platform functions, while organizational frameworks conceptualize a firm collective contributing to the complements.

On the non-technical side, network effects describe the utility gained by users of a particular product or service in relation to the overall userbase. Adoption externalities arise as social benefits accrue the bigger a network becomes—for an example, as more users subscribe to a telephone network, the network's value increases which in turn attracts more users. Additionally, network effects are influenced by expectations pertaining to the availability of complementary commodities and compatibility with other products (Katz and Shapiro, 1994). Networks effects can materialize same-side or cross-side, generating positive or negative externalities. Telephone users benefit by having more people subscribe to their network, a positive same-side externality. On the cross-side, the value of a credit card to a customer increases as the number of merchants who accept it goes up. Multi-sided markets exist when an intermediary entity—a multi-sided platform—facilitates matching between two or more different types of users where value is generated through network effects. As a result, network effects constitute the demand side of economies of scale. Parker, Alstyne, and Choudary (2016) contend that a platform facilitates matches and enables value-creation for its participants by 'inverting' the firm structure, as value is primarily created outside the firm. They emphasize that platforms must possess a core interaction that generates value and justifies participation in the system. They deem this core interaction a by-product of algorithms curating an exchange of information for participants. Alstyne, Parker, and Choudary (2016) also assert that established models in management, such as Porter's five forces, behave differently when it comes to platforms since they do not factor in network effects and treat external forces as a threat. They make the case that platforms derive value from external forces and the dynamic roles of participants. For an example, Google does not employ the developers who create applications hosted on Play Store and run on the Android operating system nor does it charge users for downloads (it receives a 15-30% cut from app earnings). Developers have the freedom to choose their monetization policy whether by charging for subscriptions, adding in-

app purchases, or running advertisements, but Google benefits from the ingenuity provided by these developers while funnelling users to its operating system as the value of the Android OS increases with the increase in quantity and quality of its complementary applications. Furthermore, users can become developers and developers can be users, offering a seamless interchange of roles for the participants. The researchers note that what platforms regulate is the degree of openness at the architecture and governance level. Open architecture facilitates external participation and innovation, while governance specifies who reaps the rewards and the boundaries of each role assigned within the platform.

Cross-subsidization is a common practice among businesses operating in multi-sided markets, as one side receives services at a rate lower than the marginal cost to incentivise growth of the userbase (Australian Competition & Consumer Commission, 2019). Value in a platform model is primarily generated by advertising revenue, which requires economies of scale. Advertisers profit by exposing a vast userbase to their products and services, additionally benefitting from the infrastructure, artificial intelligence, algorithms, and analytic tools powering the platform. Advertising on digital platforms is also more cost effective than on other mediums as fixed costs can be minimized and customers are targeted more directly. On the flip side, users benefit by receiving products or services at minimum costs in avenues such as entertainment, social media, e-commerce, news aggregation, search engines, online trading, etc. The platforms, through subsidizing their userbase and attracting a large following, monetize the attention captured and systemically enhance their algorithms to facilitate higher quality matching, which attracts more users, and so on in a perpetual feedback loop. Advertisers are increasingly focusing on digital platforms because they receive higher returns on advertisement campaigns, while transaction costs (including search and bargaining costs) are mostly nullified, giving consumers more information to assist in decision making. Figure 1 showcases how subsidized access to consumers facilitates the exchange of value for all participants in a digital platform (Australian Competition & Consumer Commission, 2019).

Figure 1. Subsidization model for multi-sided platforms (Australian Competition & Consumer Commission, 2019)

II. Types of digital platforms

Bonina et al. (2021), following the classification of digital platforms put forth by Cusumano, Gawer, and Yoffie, (2019), categorize platforms as either transaction platforms or innovation platforms. Transaction platforms facilitate matches between different groups of users, exploiting network effects to scale up and deliver value while reducing or eliminating transaction costs. In addition to matching different groups of users, transaction platforms can also incentivize co-creation. Literature on transaction platforms focuses on network effects and the possible emergence of winner-take-all markets and their impact on users. Growth of transaction platforms can be attributed to decreasing technology costs and global access to the internet. However, the researchers contend that the primary factors driving the growth of transaction platforms are the processing power and vast storage capacity—made possible through cloud computing—which supplements network effects and allows transaction platforms to reach economies of scale more efficiently. These platforms capture value in various ways such as receiving a commission from each transaction or unit sold, charging for access to services or additional features, or monetizing user data filtered through algorithms to run targeted ads. On the other hand, innovation platforms support complementary products and services through modular design architecture. Companies such as Apple or Microsoft have core products and services but their immense value stems from the integrated complementary offerings forming a large ecosystem of third-party developers and active users. Literature in this field focuses on software engineering and innovation management. The core/periphery dichotomy displayed in Figure 2 is employed as a framework for understanding innovative platforms (Bonina and Eaton, 2020). For an example, Apple controls the iOS platform, integrating it with its products and services. While Apple regularly updates iOS and introduces new features, most applications used by Apple users come from third party developers who use the application programming interface (API) to create, share, and sometimes monetize their

applications on the iOS App Store. The core of an innovative platform controls essential functions while innovative potential exists in the periphery, facilitated by the modular design of the system.

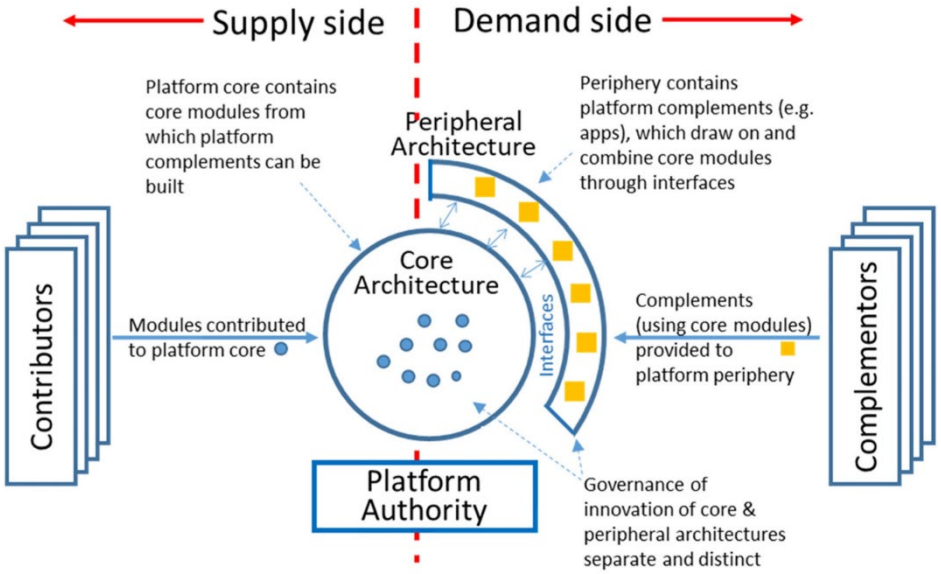


Figure 2. The core/periphery model of digital platforms (Bonina et al., 2021)

Innovative platforms are a great source of innovation due to their inherent structure and modularity, in addition to the nature of digital technology and information. Innovation platforms capture value by charging developers for access to resources (licenses or technical tools) or for access to consumers (through digital distribution channels, e.g., App store or Google Store), or by running advertisements. Bonina et al. (2021) reference an observation made by Cusumano, Gawer, and Yoffie (2019) where digital platforms, either innovation or transaction type, evolve to a hybrid platform. Transaction platforms benefit from this evolution by enhancing their services with applications or new functionalities to boost or sustain growth and create new avenues for collaboration and engagement along their multi-sided network. Another benefit is the potential for adding new transaction fees for delivery of such new services, creating new monetization streams. Since transaction platforms transitioning into this hybrid form tend to open up and allow their API to be used by developers, the data collected from this new side can be of significant value for the platform, helping to enhance curation, improve the quality of services offered, and further boost the platform's value

for advertisers. Figure 3 highlights some prominent transaction, innovation, and hybrid platforms.

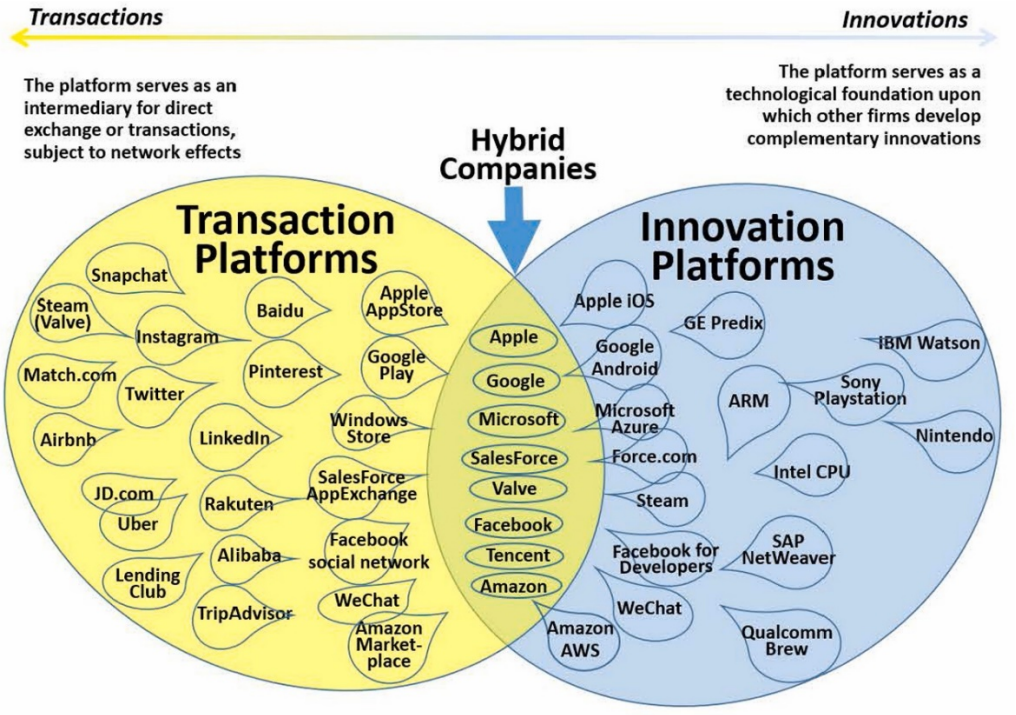


Figure 3. Types of digital platforms (Cusumano, Gawer, and Yoffie, 2019)

III. Platform boundaries and life cycle

Gawer (2020) introduces three interdependent elements constituting what he labels platform boundaries. The first element, platform sides, involves highly consequential decisions pertaining to the number of sides in a platform, who is allowed access, and which side to subsidize and which to charge higher than the marginal cost, decisions that are in turn influenced by the pricing structure set in place. In the long term, these decisions will affect the value derived from each side, determining whether the company can scale up fast enough to capture a big share of the market or lead to a winner-take-all situation. Gawer considers the second boundary, digital interfaces, to be "both a border and a bridge." He further elaborates, "It divides or demarcates economic activities, but it also specifies the characteristics of the connection or communication that it helps achieves." The spectrum of open vs closed interfaces has wide ranging implications such as the extent to which innovative complementary modules can interact and be integrated or the control a platform has over its network and the value it generates. An open platform not only facilitates access to its API—through software

development kits (SDKs) and other tools—but also supports third party developers to actively contribute and innovate, recognizing the great value-added potential and its impact on network externalities. While more closed platforms enjoy tighter control over their networks, open platforms gain an invaluable resource in exchange for their openness: user data that can be used to improve products and services by enhancing curation mechanisms, fine-tuning targeting, and informing future product innovations. The third boundary set by Gawer, platform scope, concerns a balancing act between opposing forces. Digitalization can narrow the scope of platforms since it curtails labour costs and ownership of assets, yet it can also be a catalyst for expansion since it facilitates and amplifies access to global markets to exploit network effects. Gawer argues that digitalization and connectivity reduce asset specificity since the hardware and software involved can be reused and repurposed. Transaction costs are lower in the long term which influences the construction of value chains. Direct ownership is no longer a necessity since data can be captured, stored, and analysed with little to no physical asset ownership, yet expanding to new markets and acquiring assets or complementing the services of incumbent platforms is also a viable and often-sought strategy. Gawer then attempts to integrate all three boundaries by showcasing the interdependency of platform sides, interface, and scope (e.g., interface and scope facilitate the introduction of more sides, which in turn impacts the structure of the interface, and so on). Setting the stage for presenting his framework for digital platforms, Gawer distinguishes between the launch phase and maturity phase in a platform's lifecycle, with each phase requiring a different combination of boundaries. The launch phase is characterized by a race to scale up quickly enough to kickstart a positive feedback loop that fuels network effects. Profit is often deferred in exchange for scale, which translates to generous subsidies to one or multiple sides. The maturity phase is when digital platforms can realize gains and reap profits after reaching a sufficient scale.

Gawer posits that during the launch phase, transaction platforms will have a narrow scope, expansive side configuration to compensate for minimal asset ownership and small labour force, and an open interface. As they mature, transaction platforms widen their scope by entering new markets, acquiring competition, adding more sides, and restructuring the interface to adjust to competition. On the flip side, innovation platforms during launch will prioritize ownership of assets to develop the necessary

technology and complements, facilitate access for the developer side, and attract complementary innovations through open interface. As they mature, innovation platforms will broaden their scope by internalizing technologies in the periphery or acquiring them when needed, introducing more sides, and adjusting their interface to adapt to competition and protect intellectual property. Figure 4 compares transaction and innovation platforms during launch and maturity.

Platform Type / Lifecycle Phase	Transaction platform	Innovation platform
Launch	*Proposition 1* **Scope** Narrow **Sides** One side for asset owners and/or workers **Interfaces** Open for increasing transactions and for monitoring	*Proposition 2* **Scope** Broaden **Sides** One side for complementary innovators **Interfaces** Open for third-party innovation
Maturity	*Proposition 3* **Scope** Broaden through exploiting asymmetric data flows and/or acquisitions **Sides** Add new sides to become hybrid + more selective about who can join the sides **Interfaces** Recalibrate or close to prevent rivals from accessing data	*Proposition 4* **Scope** Broaden by absorbing complements' functionalities and/or acquisitions **Sides** Add new sides to become hybrid + more selective about who can join the sides **Interfaces** Recalibrate or close to prevent rivals from accessing data

Figure 4. Launch and maturity strategies for digital platforms (Gawer, 2020)

Digital platforms have outgrown non-platform businesses when it comes to market capitalization (Alstyne, 2021), a fact made more impressive when comparing workforce size and the launch date of these businesses (Figure 5). Network effects, powered by sophisticated AI and curation in the internet age, have led to tremendous growth for comparatively younger companies that have grown bigger than their older, more established rivals. Platforms can cut labour costs because the inverted firm model creates value outside the firm by facilitating value creation for producers who attract more users and advertisers. Value creation in Twitter or Airbnb does not take place inside the firm, which explains their smaller workforce.

Firm	Start year	Employees	Mkt Cap (bn USD)	Ratio	
BMW	1916	131,000	51	389,300	
Uber	**2009**	**16,000**	**76**	**4,750,000**	12x
Marriott	1927	177,000	39	220,300	
Airbnb	**2008**	**10,000**	**101**	**10,100,000**	45x
Walt Disney	1923	199,000	163	819,000	
Facebook	**2004**	**30,000**	**473**	**15,766,667**	19x
IBM	1911	350,000	125	357,000	
Salesforce	**1999**	**35,000**	**123**	**3,514,300**	10x
New York Times	1851	3,700	6	1,621,600	
Twitter	**2006**	**3,300**	**25**	**7,575,800**	5x

Figure 5. Platforms vs non-platform businesses (Alstyne, 2021)

Research on digital platform ecology found platform ownership, value-creating mechanisms, and autonomy of complementors to be three essential components (Hein et al., 2019). Ownership defines concentration of power and the relationship with participants in the system, which encompasses centralized, consortium, or decentralized platforms. Value-creating mechanism are the intermediary aspect of platforms, where two-sided markets emerge as network effects are leveraged to facilitate efficient matching, in addition to the tools afforded to network participants which further expands the potential for value-creation. Lastly, autonomy dictates the degree of control and scale of complementors. The more autonomy a complementor enjoys the looser they are tied to the platform and more freedom they have to pursue partnerships with other platforms. Low autonomy complementors are more dependent on the platform and usually provide essential functions that directly impact value proposition.

IV. Scaling digital platforms

Büge and Ozcan (2021) studied scaling strategies of the biggest platform businesses and found regulatory complexity and regulatory risk to be two increasingly critical elements receiving little attention from managers. They evidence backlash against big tech in the wake of several major scandals and political events in the past decade as a significant factor affecting regulatory risk and directly impacting revenue streams of digital platforms. The researchers reference concerted efforts by ride-hailing and food delivery

companies to lobby for measures such as Proposition 22 in California—where more than $200 million was spent on campaigning— or Google's antitrust case as a reflection of the scrutiny platform businesses are increasingly under. Büge and Ozcan recommend scaling quickly in all cases to leverage network effects, attract investment, and improve data curation, except when both regulatory complexity and regulatory risk are high. They observe that Big Tech companies have for the most part been shielded from regulatory action due to the size of userbases they amassed and the quality of curation they possess. Messages to rally support and petitions to preserve the quality of value proposition are frequently used by these tech giants when they face political pressure, especially because they come with little to no costs as they can be seamlessly embedded with the product or service offering. Concerning high regulatory complexity and high risk, the researchers recommend a more cautious approach since it requires rigorous risk management, congruence with stakeholders, and gradual expansion (the nascent cryptocurrency sphere falls under such category). Figure 6 summarizes the researchers' recommendations.

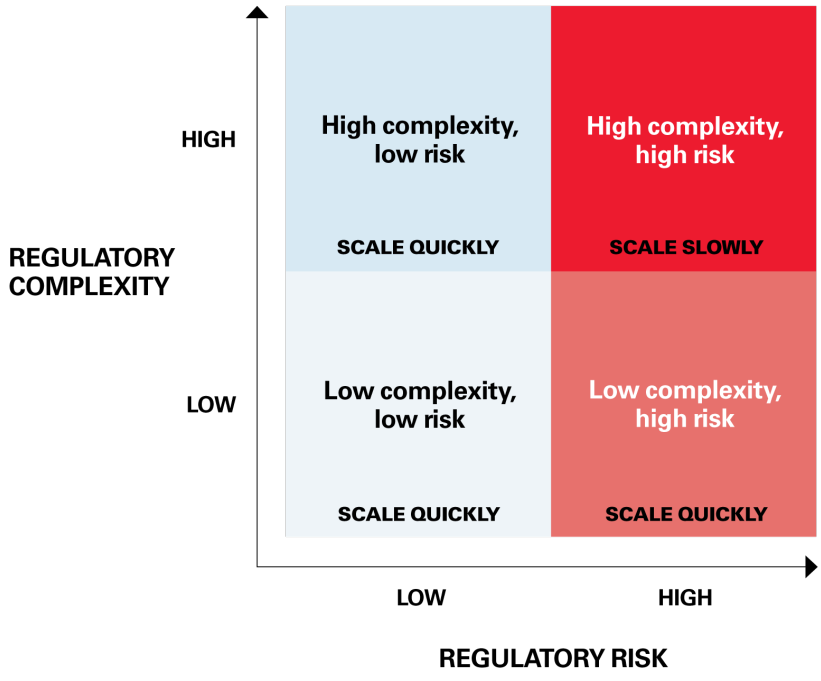


Figure 6. Scaling digital platforms against regulatory risk and complexity (Büge and Ozcan, 2021)

V. Capabilities of platform leaders

Helfat and Raubitschek (2018) used the dynamic capabilities framework formalized by Teece (2017) to propose that platform leaders need to possess three types of capabilities to succeed: innovation, environmental scanning, and integrative capabilities. First, innovation capabilities ensure platforms can operate seamlessly, maintaining delivery of services at the highest standards while enhancing salient features or introducing new products to their portfolio. Concurring with Teece, they highlight the importance of figure heads who use their prior experience to guide platforms towards reaching their innovative potential. The researchers also note that innovation in core products often leads to innovation in complementary products, with a sequential process taking place, allowing digital platforms to use the experience and knowledge gained from previous innovations in their new ones. Since digital platforms often compete in winner-takes-all markets, it is crucial for companies to not only be able to innovate and maintain their technological edge, but also to coordinate closely with complementary asset providers to ensure that their innovations are mutually compatible and part of a larger integrated ecosystem. This process requires technical knowledge, appropriate assets, internal and external coordination, and compatible artificial intelligence and algorithms to succeed. Secondly, the researchers conveyed the significance of environmental scanning and sensing as a particular feature or functionality can lose utility and technology can be rendered obsolete at rapid speeds. Some of these shifts can be changes in price, introduction of new technology by competitors, shifting consumer behaviour, and incompatibility with complementary products and services. They declared that dedicated environmental scanning teams working closely with other teams specializing in product design, feedback, and R&D will enhance the effectiveness of such operations. Top level management must also possess the mental faculties required to perceive and analyse changes in the external environment and to make critical decisions at the right time. It is important to reference research on structurally based fear in organizations and its impact on the competitiveness of platform leaders (Vuori and Huy, 2016). This research focused on Nokia and how it lost its dominant position, revealing that competing frameworks for interpreting the environment led to incohesive and misguided actions. Top managers were motivated to act based on fears related to the external environment while middle managers were motivated by internal fears related to delivering on higher

management's expectations. These fears directly influence how middle and top managers communicate among their respective groups and between each other, and consequently lead to distortions in analysis and judgment of present or future outcomes. In addition to these considerations, environmental scanning is only successful when coupled with an extensive knowledge of how a company's core product and complementary offerings are integrated as well as the absorptive capacity needed to make proper adjustments, assimilate new information, and maintain competitiveness. Finally, Helfat and Raubitschek state that integrative capabilities whether structural or internal, are vital to digital platforms, especially those seeking to create or operate within ecosystems and work closely with complementors and third parties. Integrative capabilities are essential owing to cross-side network effects and the need to align a digital platform's design architecture and monetization strategy with an established ecosystem of producers, consumers, governance, and regulatory structures. The researchers suggest that digital platforms would benefit from having teams tasked with managing integrative capabilities to coordinate internal and external relationships, functions, and projects. Digital platform ecosystems in this sense, as shown in Figure 7, can be defined as the co-specialized modular and complementary offerings of different companies linked together by an ecosystem orchestrator (Jacobides, Cennamo, and Gawer, 2018).

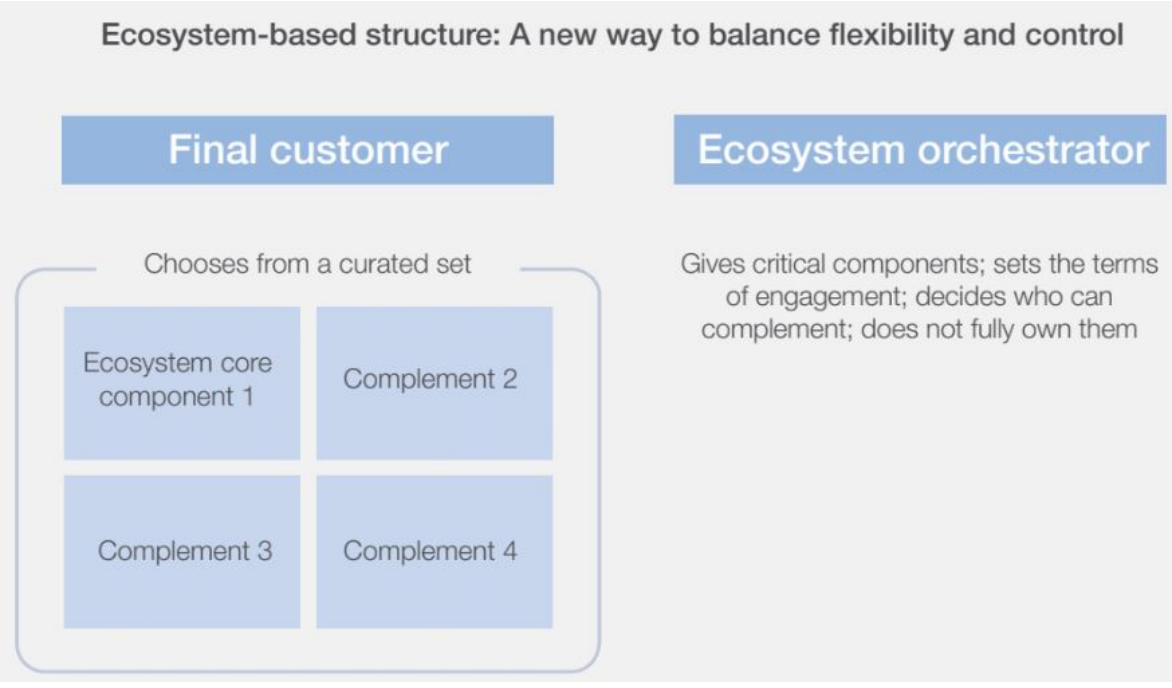


Figure 7. Digital platform ecosystems (Jacobides, Cennamo, and Gawer, 2018)

VI. Internationalization

Stallkamp and Schotter (2021) contend that most of the literature on digital platforms does not address or recognize a distinction between platforms operating at different geographic boundaries. They assert that borders and spatial proximity have varying effects on network externalities, either limiting the scope of network effects (e.g., job search, dating, or food delivery platforms) or having minimal effect (e.g., operating systems and hardware-based platforms). They proceed to link internationalization theory with network externalities by highlighting how internal firm-specific advantages (FSAs) needed to overcome the obstacle of foreignness in international markets can be expressed by network externalities. Foreign firms competing in local markets can supplement what they lack relative to local competitors by leveraging the size of their userbases and value such userbase can deliver, a significant competitive advantage. They point out that digital platforms are more adaptive and capable of managing resources outside their direct scope of control while internalizing the core design architecture and artificial intelligence powering their networks. The researchers consider a large userbase to be a type of non-location-bound FSA when it spans across countries, as users in the new market benefit from the established structure and complementary products and services associated with it (e.g., Sony selling its video game consoles globally and leveraging a vast network of digitally connected players, software developers, and third parties). The focus is on leveraging the existing global network and not on creating a new local userbase in the foreign country, since local users are being sold the opportunity to be connected to a preexisting global network. Consequently, digital platforms possessing a global userbase can compete with local incumbents in foreign countries without having to engage in M&As or pool resources into intricate adaptation strategies. Furthermore, Stallkamp and Schotter add that interoperability and compatibility across all countries are of great importance to facilitate interaction among users in different countries and complementarity of all products and services offered. On the flip side, network externalities mostly existing within a home country are location-bound and thus provide little support for international expansion on their own. Non-location-bound FSAs need to be developed and appropriately communicated to attract a userbase for a successful entry to a foreign

market. If a rival had already established a sizable userbase, it can be extremely difficult to compete with since a first-mover advantage can snowball into a winner-take-all market. The researchers suggest M&As or alliances to leverage existing userbases and pool resources in order to compete in foreign markets, a popular strategy among food ordering and delivery platforms. Decentralization and multi-domestic strategies are preferred in this context. The researchers put forth additional propositions making the case that platforms possessing cross-country externalities prioritize cultural similarity and economic connections when selecting foreign markets for entry. Cultural similarity provides easily marketable and more valuable products and services facilitating stronger interactions and connections, potentially accelerating the growth of the userbase. The same principle holds for countries connected through large migrant communities or extensive economic trade and social ties, as cross-communication between communities in these countries is carried out through digital platforms (e.g., messaging apps, IP telephony, or online money transfer). The final proposition distinguishes the nature of competition between cross-country and within-country platforms, asserting that the former can reach a critical mass enabling it to eventually dominate the global market by exploiting its larger userbase as a form of non-location-bound advantage. Within-market platforms can dominate but a winner-take-all scenario is unlikely to develop since different platforms tend to control different domestic markets. Figure 8 summarizes the propositions.

	Within-country network externalities only (direct and/or indirect)	**Cross-country network externalities (direct and/or indirect)**
Entry mode	Preference for acquisitions and alliances	Preference for independent entry
International strategic posture	Multidomestic strategies	Global strategies
Foreign market selection	—	Increased preference for culturally similar countries and countries with strong economic/social connections to home country
Foreign market exit	More likely	Less likely

Figure 8. Digital platform strategies at home and abroad (Stallkamp and Schotter, 2021)

VII. Digital platform design

Spagnoletti, Resca, and Lee (2015) propose a design theory for online communities supported by digital platforms. They identify three motivations for engaging in online communities: information-sharing, collaboration, and collective action. The researchers lay out seven propositions (four main propositions and three secondary ones) describing essential design elements covering all three motivations, the overarching theme—conveyed in the first proposition— being that digital platforms have to integrate and be compatible with complementary services to cater to the needs of various online communities. Access and participation must be easy and intuitive to attract the greatest number of users. The second proposition highlights the importance of linking digital platforms supporting information-sharing communities to prominent social media networks in order to attract new users, facilitate the creation of new relationships, and provide an additional avenue to circulate a platform's content. Integrating smart phone access through compatible webpages or dedicated applications supports this proposal. The third proposition, concerning collaboration-centred communities, advocates for creating codified rules for engagement with large personalities on or off the platform to bring together different groups of individuals. This requires a governance policy to mitigate potential harmful behaviour and encourage positive behaviour. The fourth proposition states that platforms should support collective action by reaching out to tight-knit communities and engaging in transparent communication to build up trust and coordinate on matters of importance. Establishing protocols for open discussion and representative decision-making is crucial for the success and sustenance of any form of collective action.

3- Electronic Sports

Electronic sports (esports) emerged in the nineties and branched into two distinct competitive scenes: western audiences gravitated towards first person shooter (FPS) video games relying on quick reflexes and accuracy (e.g., Doom and Quake) while eastern audiences preferred massive multiplayer online role-playing games (MMORPG) and real time strategy (RTS) games centred around strategic positioning and mastery of in-game mechanics (Wagner, 2006). The original StarCraft game, released in 1998 by

Blizzard Entertainment, was regularly broadcast on Korean television in dedicated video gaming channels with big tournaments, high production value, established organizations and sponsors, and a loyal fanbase that made celebrities out of the top players. At its core, the premise of esports is that video games can be inherently as competitive and engaging as other types of sports (Seo, 2016). Strict rules and boundaries are set governing the number of players, limitations on style of play, characteristics of the game environment, and specific in-game functions to facilitate competition. The purpose of such limitations is to minimize potential elements of luck and increase the skill level needed to outmatch an opponent. All of this takes place inside gigantic arenas hosting thousands of spectators, in addition to the millions watching tournaments online, reinforcing the distinct professional atmosphere. Metrics measuring performance—distinguishing good players from bad ones—ranking systems, local and international tournaments, professional teams, coaches, and dedicated living spaces and practice gear are all salient aspects of the esports scene. Competition in any particular game typically starts with small, local tournaments, usually self-funded by organizers who tend to be players themselves and lack the strict code of conduct and enforcement found in bigger tournaments. Figure 9 shows a framework by Seo and Jung (2016) illustrating the cogs powering the esports machine.

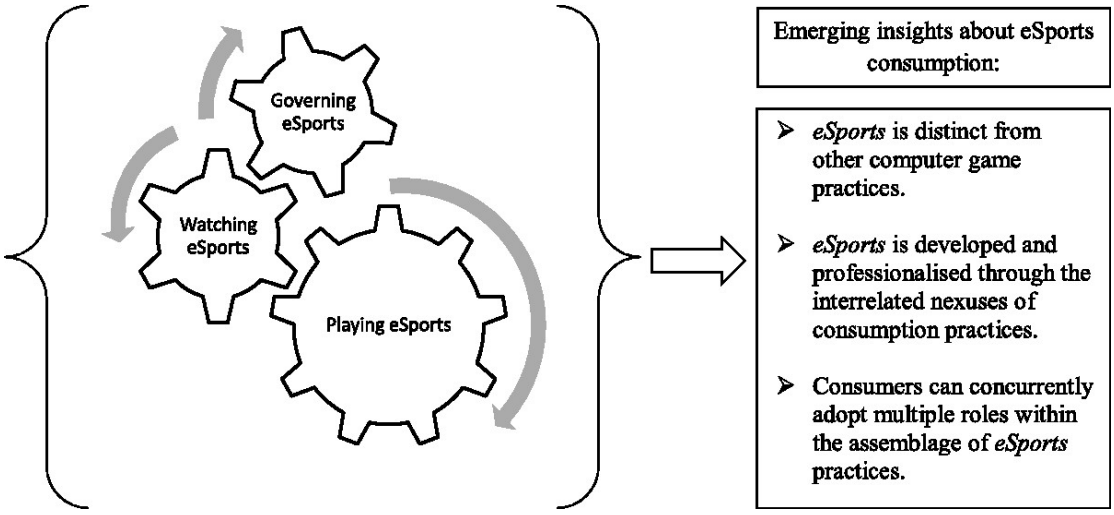


Figure 9 The esports scene (Seo and Jung, 2016)

A dedicated player base of a particular game emerges, with its own organically evolving system of strategy development and various approaches to the game, self-imposed limitations or tweaks to the gaming experience, and communities sharing knowledge

and experience. As engagement grows, players start to organize their own amateur tournaments with pooled prize money or symbolic prizes, adding a semi-professional competitive edge to the game. As more players engage with these tournaments, the prize money starts to get bigger and organization becomes more professional. A subset of the player base develops an interest in watching the game to learn new skills and become more knowledgeable (Hamari and Sjöblom, 2017) or to appreciate the skills at display, which ultimately invites more spectators to join in as the game becomes more popular. Broadcasts of tournaments attract enthusiasts and first-time viewers, giving rise to live broadcasters streaming their gameplay outside the scope of professional competition as a digital community grows to appreciate the entertainment aspect of spectating non-professional play and interacting with personalities online. Governing bodies are erected to organize and regulate tournaments and teams, set rules, code of conduct, and ensure fair play and prevent cheating. Sponsors, game publishers, and advertisers promote their products in this newfound niche, while live streaming platforms host live broadcasts, facilitating the interaction of consumers and producers. Figure 10 by Nielsen (2019) shows a more comprehensive illustration of the esports ecosystem.

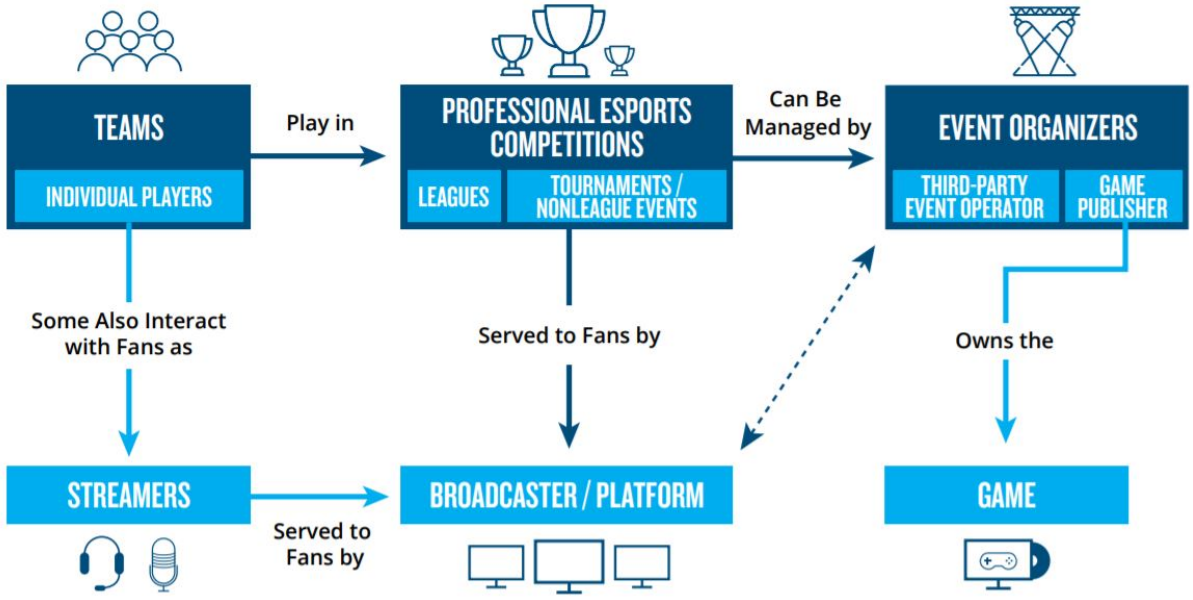


Figure 10 The esports ecosystem (Nielsen, 2019)

The industry's revenue in 2021 was projected to grow by 14.5% from the previous year, exceeding $1 billion (Newzoo, 2021). The same report projected that live streaming audiences of games would reach 920 million by 2024.

Broadcasting esports before Twitch was costly and riddled with issues from high network latency to complex setups requiring multiple software running in the background and high-end hardware to withstand running a game and livestreaming at the same time. Tournaments had to pay hefty fees to broadcast games as bandwidth costs were exceptionally high for the amount consumed during competitive games and video quality was poor in most cases.

4- Twitch

Twitch is an Amazon-owned company that provides the biggest online platform for live streaming on the internet. The digital platform has become the go-to online destination for entertainment and self-expression, successfully integrating itself as a brand and a cultural phenomenon. While video-gaming content represents the core of the platform's identity, Twitch has been steadily diversifying its portfolio to include music, sports, politics, and venues for edutainment.

Twitch's origins date back to Justin.tv, a website created in March 2007 and originally intended as a web reality show documenting the lives of its founders. Justin Kan, one of the founders, would fix a camera to his cap and roam around the city capturing his daily rituals, a novel approach unheard of at the time. The website switched to open access, allowing anyone to live stream a few months later and its popularity skyrocketed as thousands of new streamers jumped at the opportunity to capitalize on the new trend. A crucial decision was made in 2010 as the founders were discussing strategies to address declining growth. Emmett Shear, a co-founder of Justin.tv and eventual CEO of Twitch, suggested that they reorient towards video games, which at the time constituted a small percentage of overall content on the website but was garnering interest as esports games such as StarCraft 2 and League of Legends and their corresponding online and offline events were growing in popularity. StarCraft in particular had a rich competitive history, especially in South Korea, as well as established tournaments and big organizations running production and attracting world-renowned sponsors.

Twitch launched in 2011 and proved an instant success, averaging 10% growth per month by 2012. Despite remarkable growth, solid investment, and a growing multitude of partnerships, Amazon's decision to purchase Twitch in 2014 for $970 million was still s surprise to many industry insiders. Figure11 shows hours watched on Twitch from September 2012 until June 2021. Twitch's Q1 2021 viewership grew by 97% compared to Q1 2020 (Stream Hatchet Q1 2021 Live Game Streaming Trends , 2021).

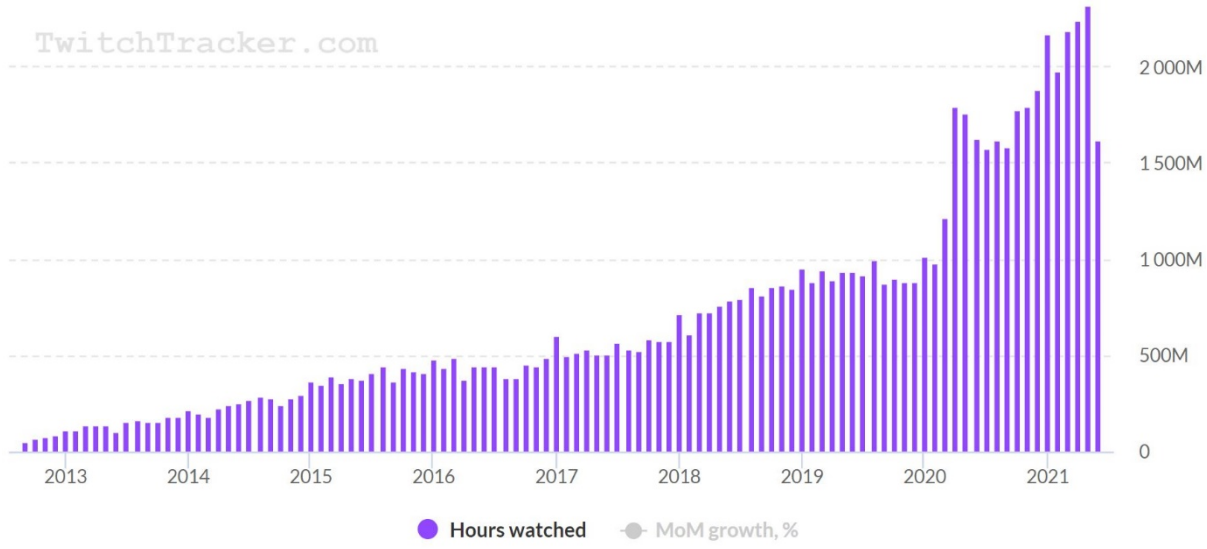


Figure 11 Hours watched on Twitch from September 2012 to June 2021 (Twitch Tracker, 2021)

The following is an analysis of Twitch's design principles and monetization system using a digital platforms framework introduced by Parker, Alstyne, and Choudary (2016).

I. Value Unit

Live streams represent Twitch's core value unit. A live stream is inherently different from a recorded video in various aspects that shape the nature of interaction with its content. A live stream takes place in real time, so it relies on improvisation and showmanship to a higher degree than a pre-recorded video. Consequently, live streams emphasize relatedness by giving streamers more room to showcase their personalities. A pre-recorded video is also bound by time and scope constraints while live streams do not conform to a particular format. Personal reflections, digressions, commentary on live events, exploring new places in real life, or interacting with locals in the street are

all activities not only compatible with live streaming but activate the medium's potential. Live streams also integrate live chat, offering a direct feedback mechanism between content creators and viewers. Furthermore, Twitch tracks and updates concurrent viewership for each live broadcast, which affects a channel's rank and visibility to viewers on the website. Broadcasters thus receive live feedback from the platform itself informing them of how their channel is faring relative to other streamers and how different activities and interactions impact viewership.

II. Participants

Twitch streamers produce content while viewers consume the content. The roles can swap or simultaneously be represented by the same person if a particular live broadcaster chooses to watch or commentate on another broadcaster's channel. Anyone can broadcast or chat by creating an account on twitch.tv while viewing channels requires no registration. Successful Twitch streamers tend to be predominantly male, with only 2% female representation in the top 250 channels. Despite that, a YouGov poll found that 30% of gaming audiences are female (Stream Hatchet 2020 Yearly Report, 2021). Twitch states that almost 75% of its users are between 16-34, a reflection of the strong video game influence on the platform, an activity where younger demographics are overrepresented.

Authenticity, essentially a measure of how in tune streamers are with their target audience (Duffy, 2018), is an important aspect governing the relationship between streamers and their viewers. This is reflective of the inherent characteristics of esports and video gaming in general, which tend to be defined by competitiveness, knowledge of gaming slang and terminologies, awareness of technology and computer gear, and a tendency to speak one's mind with little self-censorship, a legacy of how internet users communicate on forums. Streamers who do not conform to such criteria are deemed inauthentic by the audience, although such pressure to conform has been decreasing as Twitch continues to diversify and appeal to broader segments, especially non-gamers.

III. Filter

Viewers can browse categories or live channels using two main metrics: recommendations or viewership. Recommendations are powered by the platform's

machine learning algorithm which collects user data on and off-platform to suggest more relevant content. Sorting by viewership ranks all content in ascending or descending order in terms of concurrent views. Categories represent a particular video game or a form of activity (e.g., music, sports, outdoors, etc) and are further subdivided into channels created and run by broadcasters. Browsing categories and sorting by viewership will rank categories that contain highest/lowest aggregate channel viewership. It is also possible to directly rank individual live channels by viewership.

Aside from information provided by users, Twitch collects user data from web cookies, advertisers, authorized access to social media accounts, and third-party services. The vast wealth of data aids in improving Twitch's machine learning capabilities and enhancing curation and features. According to Tom Verrilli, a product manager at Twitch, the AI gauges the significance of a particular variable to audiences—e.g., chat volume—and categorises streams based on that criteria, potentially incorporating it as one of a multitude of variables impacting which channel a viewer is recommended (Stephen, 2020). The challenge of curation is multiplied when it comes to livestreams as the content is dynamic and changeable since broadcasts go online and offline, so curation has to incorporate a multitude of criteria into its system to be effective and accurate. This is essential for the future of the platform and directly impacts streamers, especially new ones who rely on discoverability to gain and maintain viewers. The bigger a platform gets, the more important the quality of its recommendation system becomes for its growth. Twitch also provides a comprehensive collection of free analytics tools for streamers to closely monitor engagement and revenue.

IV. Monetization

Regular Twitch streamers start broadcasting with no direct monetization capacity. Two potential tiers for monetization exist: twitch affiliates and the much-coveted twitch partner program. Once a streamer satisfies the criteria and becomes an affiliate or a partner, they enter into a contract with Twitch permitting them to receive subscriptions and cheers, run ads, activate sponsorships, and a slew of additional monetization options. Each of these monetization avenues will be covered in the following paragraphs.

Subscriptions: Viewers can support streamers by paying for monthly subscriptions to one of three tiers which cost $4.99, $9.99, or $24.99, respectively. Tier 1 subscriptions enable advertisement-free viewing and other channel-specific features set by each live streamer (unique emojis, badges, etc), with higher tiers unlocking additional rewards. Streamers receive a 50% cut of subscription revenue, but those averaging 10,000 viewers or more can negotiate higher margins reaching up to 70%. The gamified aspect of such monetization strategy is deliberate—gamification is defined as "the use of game design elements in non-game contexts" (Deterding et al., 2011). Twitch, far from being the first company to implement gamified design to induce engagement, realized that its audience are not only well-versed in gaming culture but also speak in a gamified language, so it sought to align its communication style with its audience's (Figure 12).

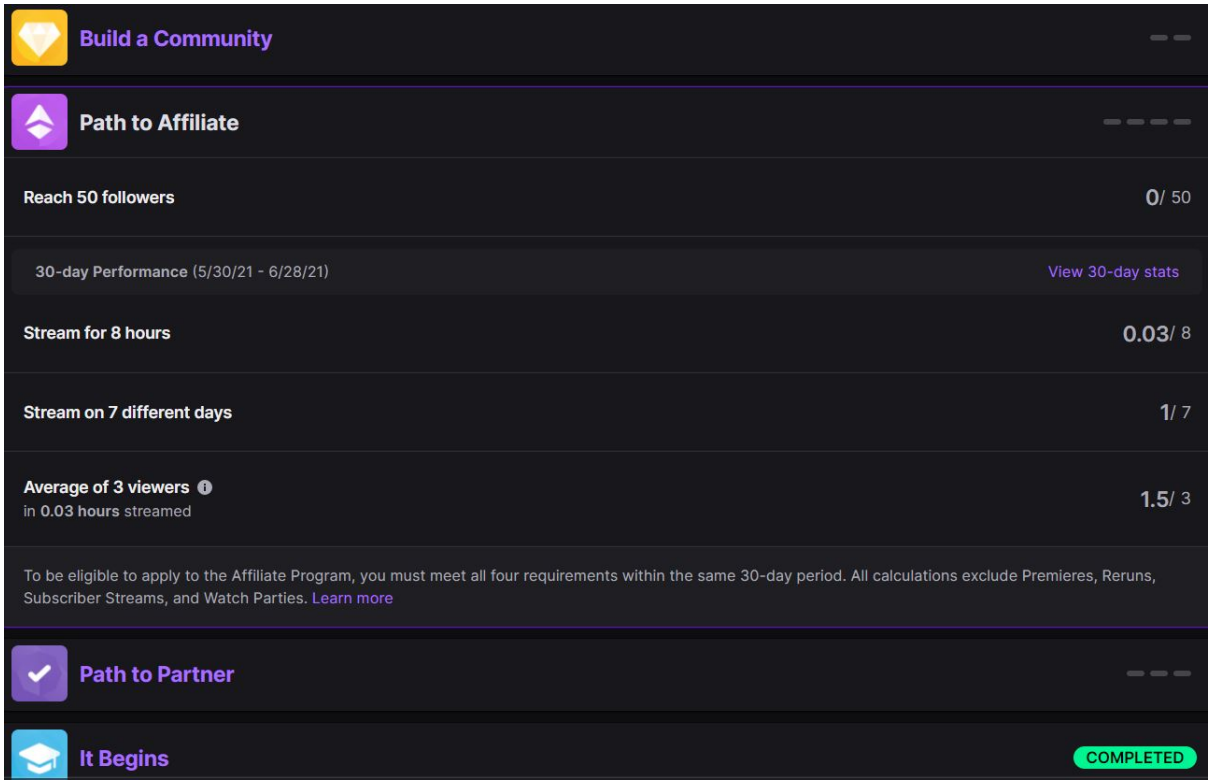


Figure 12 Example of gamified aspect incentivizing channel growth (twitch.tv)

Cheers: Cheering is a form of donation meant to show support for streamers and awards those who use it special badges that correspond to how much they paid. Twitch uses a currency called Bit, with a 1 Bit = 1 Cent rate. Streamers get 100% of the revenue from cheers.

Advertisements: Affiliates and partners can also run advertisements during their streams. They have the freedom to automatically schedule ad frequency and length or manually activate it when they wish to, but one pre-roll ad automatically runs whenever a user starts viewing a channel. Twitch receives higher profit margins on ads than subscriptions but has to contend with a significant percentage of viewers using ad block extensions preventing advertisements from running. According to a Blockthrough report, more than 843 million mobile and desktop devices were blocking ads by the end of 2020, with 69% taking place on mobile phones (2021 PageFair Adblock Report - Blockthrough, 2021). Twitch publicly states in its code of conduct that ad blocking is not prohibited nor is the viewing experience purposefully diminished for those who use it, but it encourages viewers not to ad block to support streamers who would not generate revenue from ads and to keep Twitch a free service. The platform offers a monthly service called Turbo which allows ad-free viewing for $8.99 (subscribers to a channel also receive no ads). Twitch keeps experimenting with its ad delivery mechanism to reach a balance between facilitating ads and minimizing live stream disruption. A new feature called picture-by-picture was added to prevent disruption to the live video broadcast. When activated, an ad plays in a large window while the live broadcast feed is minimized and muted but remains visible. The windows revert back to normal after the ad ends.

Small streamers do not generate much revenue from ads due to high usage of ad block extensions, ads repelling a portion of potential viewers, and small streamers not having enough viewers to convert impressions into significant revenue. The cost per mille (CPM) used is not publicly shared since streamers sign non-disclosure agreements with Twitch when they become an affiliate or a partner, but it differs according to streamer size and can be negotiable.

Sponsorships: Twitch also facilitates sponsorship deals for select affiliates and partners by acting as an intermediary. A bounty board shows available sponsorship opportunities covering all details pertaining to price, requirements, and concurrent viewers needed for activation. This is Twitch's mechanism for "internalizing the flow of money" (Parker, Alstyne, and Choudary, 2016). By positioning itself as an intermediary between streamers and sponsors, Twitch can leverage such position to charge a commission per finished deal, collect information about sponsorship experience from

sponsor, streamer, and viewer side, and ultimately improve the platform's reach and value to sponsors. Aside from sponsored Twitch streams, sponsorship offers can request a promotional YouTube video, a live appearance at an event, or sponsored social media posts. The average rate for sponsored streams ranges from 1 cent to 1 dollar per viewer, which generates lucrative opportunities for large streamers who average +10,000 viewers. Successful streamers tend to receive plenty of sponsorship opportunities outside the platform, with famous personalities getting sponsorship deals from major brands such as Adidas, Gillette, Verizon, and others. Figure 13 by Nielsen showcases some ways sponsored products are promoted on Twitch's live broadcasts (Esports Playbook for Brands, 2019). Each contract specifies the way a product is required to be promoted.

Figure 13. Types of sponsored content on Twitch (Nielsen, 2019)

V. Openness

Twitch's API is user-friendly and provides tools for broadcasters to create and integrate extensions into their channels. Many streamers end up creating innovative extensions that enhance their audience's experience and increase interaction frequency.

VI. Governance

Twitch's ecosystem is supported by constantly evolving guidelines. Hateful conduct, violence, gore, pornography, and scamming are prohibited. Twitch integrates automated moderation to block potentially unwanted messages from appearing in the chat box or donation messages. Additionally, real moderators are often recruited by broadcasters and tasked with ensuring that rules are adhered to throughout interactions on the channel. This has become a norm within Twitch and every channel with a large following has multiple mods supervising chat activity. Some mods are paid by streamers, treated as employees, and expected to be fully committed to their tasks while others choose to mod voluntarily to help the broadcaster, consequently becoming an integral part of the community and developing deeper relationships with the streamer and their viewers. Every streamer can have their own set of rules, complementing Twitch's code of conduct, and those who violate them can get banned temporarily or permanently from the channel at the behest of the broadcaster. Twitch does not interfere with channel moderation, but staff can provide assistance or support when asked.

Twitch released its first ever transparency report to cover 2020. In the report, the company emphasized the difference and challenges pertaining to the tools needed, skills required, and governance approach when it comes to livestreams as opposed to pre-recorded videos (Twitch.tv Transparency Report 2020, 2021). The need for cooperative partnership and empowerment of content creators set the tone for the remainder of the report, which covered four primary tiers of governance: community guidelines, service level agreement, channel level safety, and viewer level safety (Figure 14).

Community guidelines: Twitch's community guidelines set expectations and boundaries for content on the platform, infringement of which warrants enforcement action. The need for clarity in communicating and enforcing these rules is critical because backlash is quick to follow when action or lack of action is deemed unjustified or inconsistent. Twitch stated that it aims to regularly update its guidelines as the community culture continues to change and evolve.

Service level agreement: This comprises the enforcement mechanism utilized by Twitch. Machine detection is particularly challenging as the AI needs to detect content (sexual content, gore, etc) as it transpires live to trigger any automated enforcement

action or flagging for subsequent review. Machine detection is a perpetual work in progress with constant improvement potential. Another component is user reporting, which relies on viewers, content creators, or moderators reporting channels for violations, with Twitch's content moderation team reviewing the reports. This team is ultimately responsible for deciding what action takes place pertaining to AI-flagged or manually reported channels. This team prioritizes reports and supports over 20 languages to cover the widest margins possible. Skilled investigators are also employed by the company to pursue the most serious cases in tandem with law enforcement.

Channel level safety: This comprises a set of tools designed to empower broadcasters by allowing them to regulate their channels the way they wish to. Auto Mod is a machine learning algorithm designed to automatically detect, flag, and filter out terms that are discriminatory, sexually suggestive, profane, or offensive. Mod View represents the customizable mode of moderating a channel, which includes predetermined moderation levels, options to manually filter out specific terms, blacklists, and a slew of additional actions. Moderators are individuals tasked with enforcing a particular streamer's channel rules and assisting viewers when possible. They are chosen by broadcasters and any one channel can have multiple moderators, with big channels typically having more moderators than smaller ones to manage the additional traffic. Some broadcasters chose to hire moderators, who tend to be members of their communities, and provide them adequate pay with the expectation of full commitment to moderation tasks.

Viewer level safety: In addition to channel-specific moderation, viewers also have a degree of control over the type of content they are exposed to. Content warnings on mature channels are shown, filters and automatic blocking of specific words in chat are also available.

On the advertiser side, Twitch reviews a channel's track record to ensure ads are only shown on broadcasts with good standing and positive image. Advertisers can also target streams based on particular games that cater to specific audiences or target channels based on age or content rating. Awareness of the ephemeral nature of livestreams prompted Twitch to craft an enforcement strategy centred around warnings or temporary suspensions as opposed to removing the content itself. Furthermore, the company expanded its enforcement strategy to include off-platform activity.

Harassment, extremism, violence, or threats made on other platforms against members of the Twitch community can now warrant enforcement action. Twitch announced that it has brought an investigative law firm to handle sexual assault or discrimination in addition to providing a dedicated email for reporting such behaviour. This type of policy is novel and the platform as well as the rest of the industry are experimenting with best practices that optimise for risk mitigation without encroaching on the rights of individuals to express their opinions off-platform. Twitch was also one of the digital platforms that suspended then President Trump's account on its website after the storming of the Capitol building. Such decisions might have significant ramifications pertaining to digital platform policy as evidenced by Facebook's own oversight board upholding the suspension of the former president's account for multiple violations but requesting that Facebook review the indefinite suspension ruling and choose an enforcement action consistent with Facebook's policies which do not contain indefinite suspensions (Oversight Board, 2021)—content removal, timed-bound suspensions, or account deletion are viable options. Other recommendations from FB's oversight board include correlating the length of timed suspensions with the level of harm caused or mitigated, transparently conveying the reasoning behind all enforcement action against influential individuals, entrusting review of political material to a specialized and knowledgeable team and developing a contingency policy for handling novel incidents. The board's recommendations shed light on the direction digital platform governance might potentially head towards.

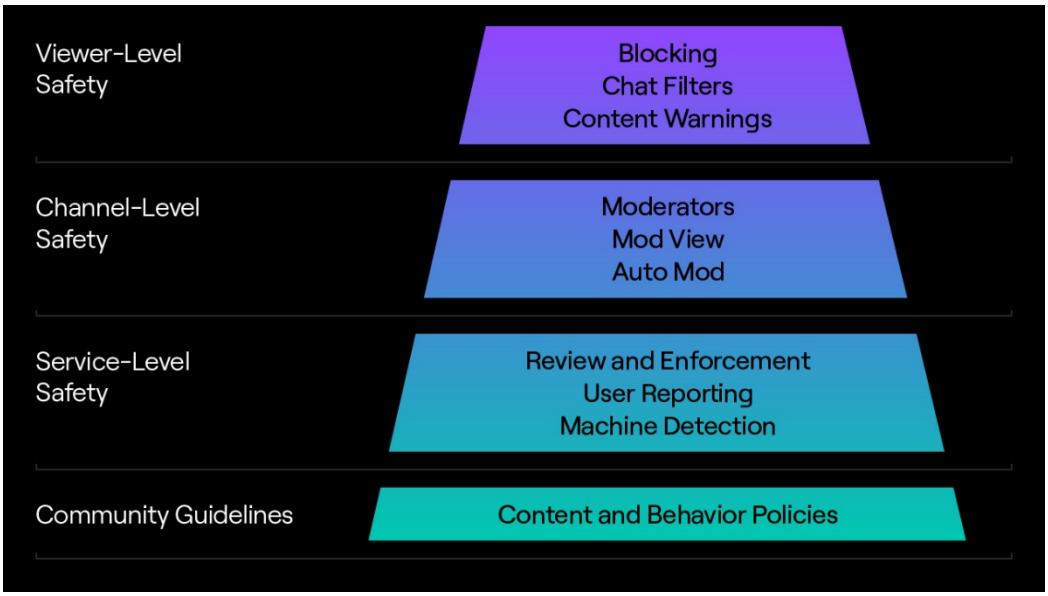


Figure 14 Twitch's Transparency Report 2020 (Twitch.tv/p/en/legal/transparency-report)

VII. Regulation

DMCA notices and takedowns were largely insignificant until 2020 when major music record labels started sending takedown requests to Twitch asking for past streaming sessions of various broadcasters to be deleted for including music played in the background without their permission. Twitch initially responded by deleting the broadcasts or clips in question and notifying streamers to delete all previously recorded sessions or clips containing copyrighted music or risk receiving further copyright strikes, which can potentially end up terminating the entire channel under the DMCA law. Streamers only had a three-day notice to delete entire archives of recorded sessions while receiving no technical support form Twitch. The company has since issued a public apology and promised to improve their communication and response to such events. Twitch eventually integrated tools to notify streamers of the specific VODs or clips receiving copy strikes, more ways to sort and delete infringing content, and improving the automatic system muting VODs with unauthorized music. The threat of DMCAs has since been a reoccurring issue plaguing the platform with inconclusive agreements between Twitch and major record labels leading to no tangible outcome.

The issue of DMCA takedowns and platforms' response to it is also a by-product of the automated nature of these processes. 95% of YouTube videos and 99% of comments removed between Jan 2021-March 2021 were automatically flagged (YouTube Community Guidelines enforcement, 2021). This is consistent with trends preceding COVID-19, with the pandemic only accelerating the process. Similarly, Twitch's 2020 automated chat removals comprised 77% of all 207.7 million removed messages throughout the year (Transparency Report 2020, 2021). DMCA notice takedowns and strikes are automated and do not factor in the nuances of each case, which often results in channels receiving strikes, bans, or having their content deleted abruptly. Those receiving notices have to wait for a long time for any appeal process to take place. Facebook Gaming has responded by striking deals with major record labels such as Sony Music, Universal, Warner, and others to ensure that their broadcasters are mostly protected from DMCAs (Making Music & Streaming Easier, 2020).

VIII. Emergence of livestream-supported products and services

Large video game developers have started featuring a "streamer mode" to their online gameplay settings to protect the privacy of streamers who often have to deal with viewers disrupting their gameplay to appear on stream—a practice known as 'stream sniping'— or to protect streamers against potential DMCA strikes from record companies by offering 'DMCA-free music'. Messaging applications frequently used by broadcasters have also introduced a similar mode to shield sensitive information from being shared on stream.

The Twitch ecosystem gives rise to a variety of subcommunities that utilize various tools to communicate and interact among each other. The average Twitch broadcaster has to deal with obtaining, setting up, and operating high-end hardware and multiple software applications in order to live stream, which requires an above average level of knowledge and capacity to operate such devices and systems. A computer meeting the minimum requirements to live stream, a good camera and microphone, and live streaming software are the basic requirements. Additional equipment or programs add flare and character to each stream, with some streamers opting for a high production quality to augment their broadcasts while others choose to meet the basic requirements and focus their activities on more social content. It is important to note that since the vast majority of new video games require high-end devices to run smoothly, most streamers who play video games have high-end computers and fast internet connections. As popular streamers have the resources to acquire additional hardware, most of them supplement their broadcasts by introducing high quality lighting, audio mixers, and high-end microphones and cameras.

Sjöblom et al. (2019) examined 100 of the top performing live streaming channels through the lens of affordance theory. Social affordances are defined as "the social structures that take shape in association with a given technical structure" (Postigo, 2016), and the study sought to reveal the prevailing practices associated with such affordances among live broadcasters. The research found that 100% of streamers used a microphone and added social media links on their profile page, while the majority had a webcam, links for donations, sponsors, and subscriptions, a description of their streaming device specifications, and an FAQ section. The researchers went on to create a new category labelled "revenue affordances" described as the structures driving

monetization from a social and commercial angle. These affordances manifest in highly popular practices such as maintaining an updated list of top donors to the stream and acknowledging new donations through automated text-to-speech functionalities that read donation messages out loud and/or pop-ups celebrating donations and new followers. Social affordances manifest in the presence of audio and video to personalize the streamer and create an engaging setting encouraging participation.

IX. Live Chat

The live chat is the primary method of interaction among viewers or between content creators and viewers. This feature adds an immense value to the platform. The most successful streamers, in addition to possessing appealing personalities or high skill levels in a particular game, are the ones who maintain an active engagement with their communities. One paradoxical element of such functionality is that the more popular a streamer becomes, the less accessible their chat environment gets due to the high number of participants competing for attention throughout the finite streaming hours and limited viewing space and cognitive capacity of a broadcaster. This leads to the widely popular practice of viewers subscribing to leave a message to get the attention of the broadcaster or the rest of viewers, since most streamers allow subscribers to leave a message to be read by AI-voiced text-to-speech. This practice is financially lucrative for streamers who receive money in exchange for a viewer receiving their minute of fame. This raises a slew of moral issues pertaining to exploitation and parasocial relationships plaguing the platform owing to its inherent characteristics. Ford et al. (2017) observed that 'crowdspeak' takes hold in a large streamer's chat, which introduces different dynamics, consequently necessitating different benchmarks to measure the effectiveness, intentionality, and quality of communication. This type of language relies on knowledge and usage of references, symbols, internet slang, and awareness of trends and fads. Participants in large chats adapt their style by shortening messages, excessively using emotion icons (emotes), contributing with less original but well-known messages (memes), and adopting a collective voice.

Twitch memes and emotes emanate from industry figures, Twitch staff, streamers, video games, and community members. The slang is derived from platform-specific jargon which streamers and users contribute to, as well as internet memes, video game

references, and technical lingo. This unique language defines the platform and its users while serving as a signaling device for other members of the community outside the boundaries of Twitch. As the userbase grows bigger, the language itself seeps into the mainstream, and thus Twitch reaches new audiences not necessarily by exposure to live broadcasts first but by exposure to its language. This can act as an onboarding process for the platform and is primarily delivered through existing community members. Twitch allows third parties and its userbase of producers and consumers to create and share their own emotes which are represented both textually and pictorially.

X. Just Chatting

A rapidly growing category named 'Just Chatting' generated the most viewed hours in 2020. It involves minimal gameplay and focuses on interactions with chat and allows for more personal two-way communication where streamers initiate conversations and share personal stories with the stream. The growth of this category reflects the shift in the type of content Twitch is gearing towards, with less emphasis on gaming to broaden the appeal of the platform to incorporate other areas such as watch parties, politics, sports, music, and talent shows. One particularly popular type of content is labelled 'react content' and involves a streamer watching a video, reading an article, or talking about a trending topic in the news or on social media. The practice is sometimes frowned upon as it is considered a passive form of content creation but there is also the view that commentary is transformative, adds value, and can be considered content of its own. Aside from commentary, many streamers opt to go outdoors—replicating how Justin Kan originated the platform—to stream their normal lives as they go to restaurants, clubs, travel to other countries, and interact with locals.

Innovative formats have emerged under this category as streamers started to create their own entertainment shows or podcasts, inviting colleagues and entertaining personalities to partake in discussions, debates, or competitions. Most of these shows are self-organized by streamers at no cost to the host, but some productions have dedicated teams with substantial monetary prizes and strict rules for participation.

An annual report by Stream Hatchet showed that hours watched in Just Chatting grew by 180% in 2020, most likely due to a pandemic-induced need for socialization (Stream

Hatchet, 2021). A Stream Elements report covering the same period showed that Just Chatting topped overall hours watched for the year with 1.9 billion hours in 2020 (Stream Elements, 2021).

XI. Transparency in governance

The issue of transparency pertaining to permanent or temporary bans issued by the platform is reoccurring, with the majority opinion among top streamers and viewers that Twitch is not being transparent or has been negligent in handling the issue. Numerous instances of bans issued with no justifiable cause or reasoning have been detailed. Part of the issue stems from the fact that the rules are not clear enough such as in the case of attire, sexually suggestive content, and offensive language, in addition to the complex nature of contextualizing incidents occurring in a live format. Jhaver, Bruckman, and Gilbert (2019) analysed a dataset from the website Reddit containing 32 million posts to understand how transparency—in this case explaining the reason for content removal—affects the platform. The findings suggest that explanations for content removal reduce the likelihood of future removal, thereby leading to a healthier, more productive environment.

XII. Toxic environment

A 2019 survey by the Anti-Defamation League (2019) found that 47% of daily Twitch users experienced harassment on the platform. Dozens of women came forward in 2020 to share stories of sexual harassment, abuse, or exploitation by fellow streamers or industry employees. The scale and attention given to these allegations prompted Twitch's CEO, Emmett Shear, to share an internal email addressing actions taken by Twitch to prevent and adequately handle harassment. Female streamers are often the subject of harassment for presumably leveraging and exploiting their male audiences to donate under the pretence of potentially forming relationships with them. Such complex issue cannot be easily remedied since female streamers point out that either hiding their relationship status or being open about it puts them at precarious positions, a by-product of the significance of authenticity in creating a loyal fanbase on Twitch (Hernandez, 2018).

Twitch has also proven to be a lucrative tool to spread conspiracy theories or extreme ideologies while making money, as a New York Times investigation found (Browning, 2021).

XIII. The Twitch Ecosystem

Twitch Chat: the main vehicle of streamer-viewer interaction on the platform. The chat is often an integral part of every livestream and streamers spend a majority of their time interacting with chat.

Clips: a short video typically spanning 30-60 seconds snipped from a live broadcast. The feature can be directly accessed from the Twitch video player or by using a hotkey. It can be created by any viewer with a registered account on the platform through the website or the mobile application. Clips play a prominent role in accelerating the popularity or notoriety of streamers as funny moments, accidents, displays of skilful gameplay, or controversial opinions are often clipped by audience members. Complementary digital platforms such as Reddit and Twitter often have communities dedicated to sharing clips of Twitch broadcasters, often giving unknown streamers significant bursts in viewership that can be sustained in the long term, launching the careers of many broadcasters. This feature is similar to what Snapchat or TikTok offer as a core functionality. Clips essentially act as a community-based extension of Twitch's recommendation system, allowing viewers to share and promote the streamers and type of content they find appealing or entertaining to other mediums. It exposes external communities on Reddit, Twitter, Discord, and other platforms to Twitch streamers and attracts new audiences to the platform.

Donation messages and text-to-speech (TTS): Twitch has its own donation feature, cheers, but it also allows streamers to link to third party software to process donations and display special animations. Since viewers can include messages with their donations, streamers often have a text-to-speech program reading out the messages using one or several preselected AI voices. This dynamic adds an interactive element to donations since donors often choose to include witty or creative messages to engage with streamers and viewers. Streamers can manually set a minimum donation amount to be read through TTS, which drives some viewers to donate purely for the momentary recognition of the streamer and viewers.

Reddit: Most prominent Twitch streamers have their own subreddits where dedicated fans create, share, and discuss topics associated with the streamer or socialize among themselves. The broadcasters themselves are often active on these subreddits, regularly reviewing it when they go live to further engage with community members or by posting on the subreddit. The biggest subreddit dedicated to Twitch is called 'r/LivestreamFail' and has 1.2 million members with tens of thousands of members online at any given moment. It acts as an extended discoverability function for Twitch, introducing viewers to new streamers or propagating the popularity of established ones since many streamers can receive a flux in viewership if their clips end up on the subreddit owing to its large and active userbase.

Twitter**:** Presence on Twitter is mainly used to interact with other streamers, inform viewers of a livestream going online, or product promotions.

YouTube: Most streamers have dedicated YouTube channels. YouTube is a valuable complementary monetization platform since Twitch livestreams and pre-recorded YT videos do not compete with each other. The content of YT videos is often directly taken from Twitch broadcasts and requires minimal editing. Big streamers have fixed schedules for releasing YT videos, utilizing analytics and often hiring professional video editors to ensure that the content is exciting for both first time viewers and avid fans. Livestream highlights and collaborations between streamers are the most common type of Twitch-related YT videos. Leveraging YouTube's bigger userbase and superior recommendation AI allows Twitch streamers to diversify their discoverability and revenue streams, in addition to introducing new viewers into Twitch, growing streamers' channels and the platform itself.

Instagram: Twitch streamers use Instagram to further extend their digital presence, sharing moments from their lives outside of Twitch, engaging with and promoting sponsors, and releasing announcements for upcoming projects.

XIV. Competition

Twitch's main competitors are YouTube Gaming and Facebook Gaming. Mixer, a 2016 live streaming platform originally launched as Beam and acquired by Microsoft shortly after, ceased operations in July 2020. Understanding the reasons behind Mixer's failure is crucial for gleaning insight into the success factors of digital platforms.

Microsoft managed to successfully integrate Xbox consoles and PCs with Windows 10, in addition to creating a profitable subscription service that delivers access to numerous games (Xbox Game Pass) through a dedicated online network (formerly known as Xbox Live). These products and services are compatible, intrinsically linked, and require little to no onboarding to use, since Microsoft dominates the desktop/laptop operating system market while online subscription-based services are the norm for video game consoles. More importantly, Microsoft had a source to pool users from since these services leveraged its existing base of console players and Windows users. Xbox's strategy is oriented towards creating an ecosystem capable of delivering products and services across all its interconnected devices, which encompasses mobile phones, video game consoles (new and old), PCs and laptops, smart TVs, subscription services, and the cloud (Figure 15). In an interview preceding the launch of the latest Xbox console, Phil Spencer, executive Vice President of Gaming at Microsoft, stated that Xbox's new competitors would not be Nintendo or Sony, but Google and Amazon, citing the latter two's capacity to reach an audience of seven billion gamers wherever they are and whatever platform they access for entertainment (CNBC, 2020). A look at the video game industry's revenue figures explains this shift. Xbox's traditional competitor, Sony's PlayStation, generated approximately 70% of its sales in FY2020 from digital games, add-on content, and network subscription services. This played a significant part in Sony's decision to sell PlayStation 5 at a loss as they knew the loss would be offset by digital sales. Microsoft's 2020 annual report reflects the same sentiment, with a decrease in hardware sales offset by growth in digital content.

Figure 15 The Xbox ecosystem (https://news.xbox.com/en-us/2021/06/10/whats-next-for-gaming-highlights)

The gambit on Mixer assumed that it fit with Xbox's vision and ecosystem. The issue, however, is that the motivation for opting into the Xbox ecosystem and the motivation for watching and engaging with a livestream platform are completely different. Xbox's online network, subscription service, cloud gaming, and PC/mobile availability all derive their value from Xbox's brand. Successful livestreaming platforms derive value from the communities they cultivate. Digital communities emerge out of synergies between a platform's inherent characteristics and its dedicated userbase.

Mixer's user interface (UI), backend, seamless integration with Windows and Xbox, clear guidelines, strong streamer support, and novel features were all positive selling points working in its favour. The platform used a protocol called faster than light (FTL) to significantly reduce live stream latency, enhancing the quality of interaction between streamers and their audiences. Another feature called 'hypezone' automatically generated clips of the last minute before a streamer won a match in particular games and posted them to a hub dedicated for these moments. This acted as a great discoverability mechanism for small streamers who would receive a surge in views and potentially manage to sustain a portion of this new audience. Mixer also introduced a feature allowing viewers to take control of a streamer's game, enhancing the streamer-audience interaction sphere. Furthermore, benefitting from Microsoft's massive Windows and Xbox platforms, Mixer was integrated into both products in addition to having a highly accessible mobile application facilitating streaming and viewing at ease. Nevertheless, Mixer's blunder was its approach to communities. It managed to attract two of the biggest Twitch streamers at the time, Ninja and Shroud, by offering exclusivity contracts worth tens of millions of dollars. The assumption was that these streamers would migrate to Mixer and bring their communities with them, which would kickstart the positive feedback loop needed on both producer and consumer side to scale up quickly. What ended up happening, however, was an initial influx of viewership to the website followed by a sharp drop. The two biggest signings lost a significant portion of their viewers and received fewer average views than what they had on Twitch—Ninja and Shroud lost 74% and 88% of their audiences respectively from May 2019-2020, according to a report by Stream Hatchet (2020). Facebook Gaming, having launched early 2019, managed to leapfrog Mixer, whose growth deceased by -5.83% from Q3 2019-Q2 2020 (Figure 16).

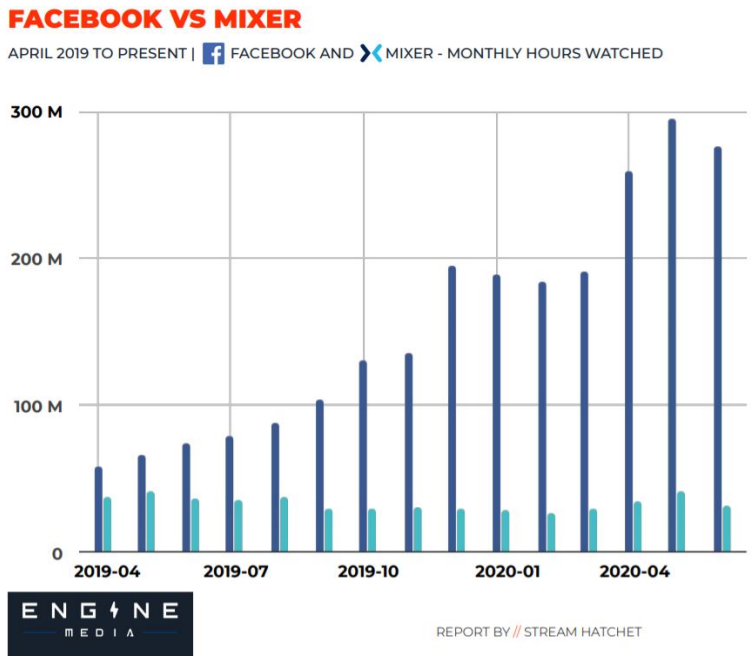


Figure 16. Facebook vs Mixer year-over-year growth (Stream Hatchet, 2020)

Microsoft eventually partnered with Facebook to facilitate the migration of Mixer streamers to Facebook Gaming after the former's closure—Twitch ended up receiving most of Mixer's streamers, according to a Streamlabs and Stream Hatchet 2020 Q3 report (2020). Another partnership with Facebook was announced the same day stating that Microsoft's cloud gaming service, xCloud, would be integrated with Facebook. The announcement noted that such partnership would offer promising grounds for running playable ads, adding new depth to Facebook's advertising power, while also allowing Microsoft's Xbox to exploit Facebook's global userbase and network to attract and reach new players. Phil Spencer admitted that Mixer could not scale up quickly enough to match Xbox's vision and type of experiences they wanted to deliver. Mixer sidestepped community building and relied on the acquisition of famous streamers to attract viewers. Another hurdle to overcome was the nature of exclusivity contracts Twitch affiliates and partners had to agree to. Twitch's affiliate contracts have a 24-hour exclusivity period where live content produced through Twitch cannot be broadcast on other platforms. Partners, especially ones with big audiences are able to negotiate their contracts but the majority remain under the same rules.

YouTube boasts 2 billion monthly users with over a billion hours watched every day. While these stats dwarf anything Twitch had ever reached, YouTube Gaming constitutes

a significantly smaller portion of YouTube's overall viewership. However, YouTube's enormous scale plays in its favor, evidenced by YouTube Gaming's steady growth in viewership each quarter. YouTube's backend is superior to Twitch's and Facebook's. Livestreams are easily accessed, paused, rewound, and continued. YouTube's curation is also more sophisticated whether for search or recommendations, allowing users great freedom in finding videos through keywords, highly specific filtering options, or a recommendation system that drives discoverability for new content. It is not surprising that a company owned by the most dominant global search engine provider would excel at recommendation and discoverability. YouTube is also able to leverage its video on demand (VOD) archiving system which allows for excellent avenue for monetization or content creation (editing parts of a VOD to create short clips or highlights, potentially sharing them on other platforms). There are growing concerns among Twitch streamers and industry analysts that Twitch lacks avenues for long-term growth relative to YouTube Gaming and Facebook Gaming who can leverage their far bigger userbases to grow their livestreaming platforms. It is easier for YouTube to facilitate a live streaming environment to its established audience than for Twitch to attract new audiences to leverage its existing livestreaming ecosystem.

Furthermore, Twitch's interface is not intuitive. For an example, to view a channel's VODs, you need to click on the channels name, an action that is not intuitive or indicated by any special marker or symbol. Viewing clips also requires more effort and using two different filtering options. YouTube's interface is simple to access and use. Figure 17 compares all major livestreaming platforms in terms of growth between Q3 2019-Q2 2020 (Stream Hatchet, 2020).

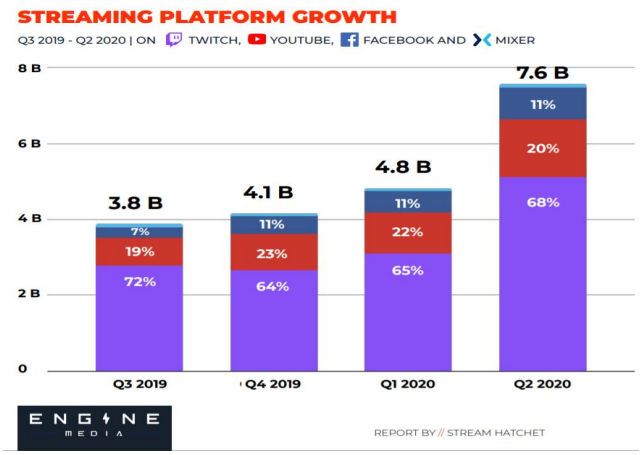


Figure 17. Q3 2019-Q2 2020 Growth of all major livestreaming platforms (Stream Hatchet, 2020)

XV. Twitch and esports in Italy

The Italian Interactive Digital Entertainment Association, in collaboration with Nielsen, released their 2021 Italian esports report in May (Italian Esports Report, 2021). The following is a summary of their findings.

Avid Italian esports fans—those following esports on a daily basis—are willing to spend up to 63.8 € on esports merchandise, in-game passes, subscription services, attending live events, and other expenditures per month. Fans following esports several times a week are willing to spend 39.6 €. Regular and avid fans have highly positive attitudes towards sponsors in esports, averaging 74% and 83% respectively, ranking higher than traditional sports fans. Gaming products, energy drinks, snacks, and internet services rank as most suitable for sponsorships. Figure 18 compares Twitch and YouTube Gaming in terms of several KPIs for the top 10,000 Italian live broadcasters in 2020.

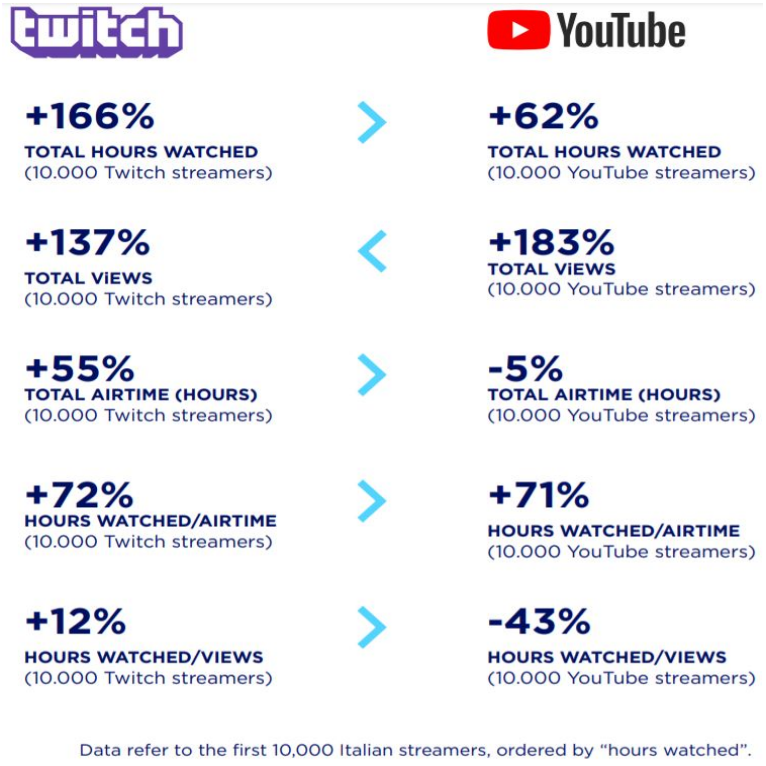


Figure 18. Twitch vs YouTube growth for top 10,000 Italian streamers in 2020 (Interactive Digital Entertainment Association, 2021)

Italian respondents reported watching Twitch an average of 3.2 hours per week, ranking higher than popular platforms such as Netflix (3.1), Amazon Prime (2.2), Facebook Gaming (2.0), and YouTube Gaming (2.0). Twitch is the favoured platform for

watching live esports events, while YouTube is the go-to place for catching up on recorded events, as shown in Figure 19. Around 62% of respondents prefer to watch events live citing higher engagement and emotional investment as the two biggest motivators.

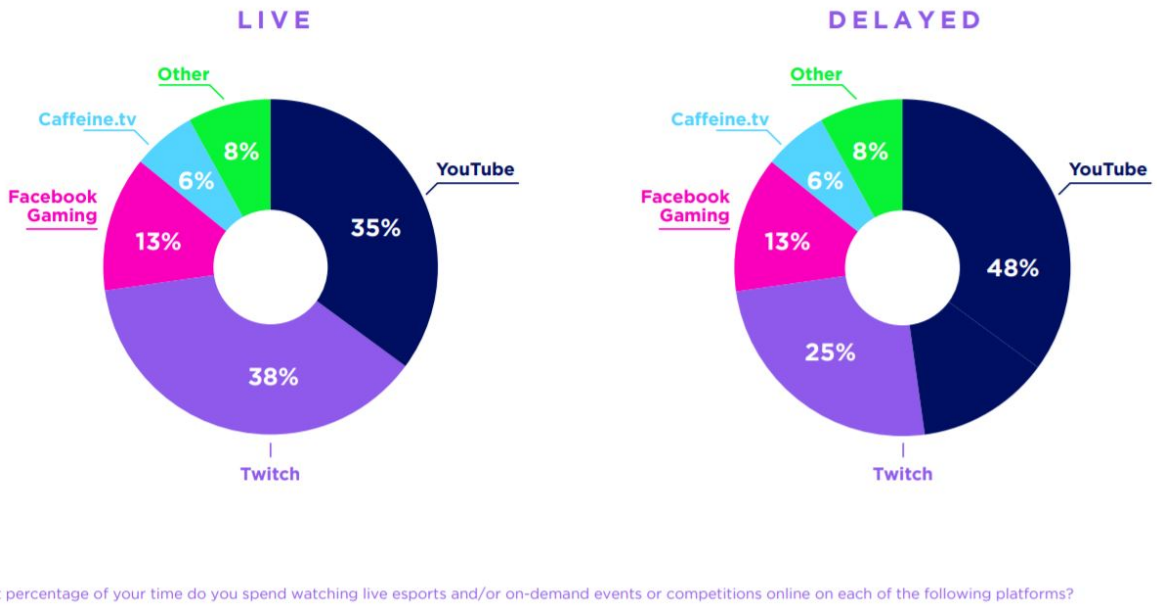


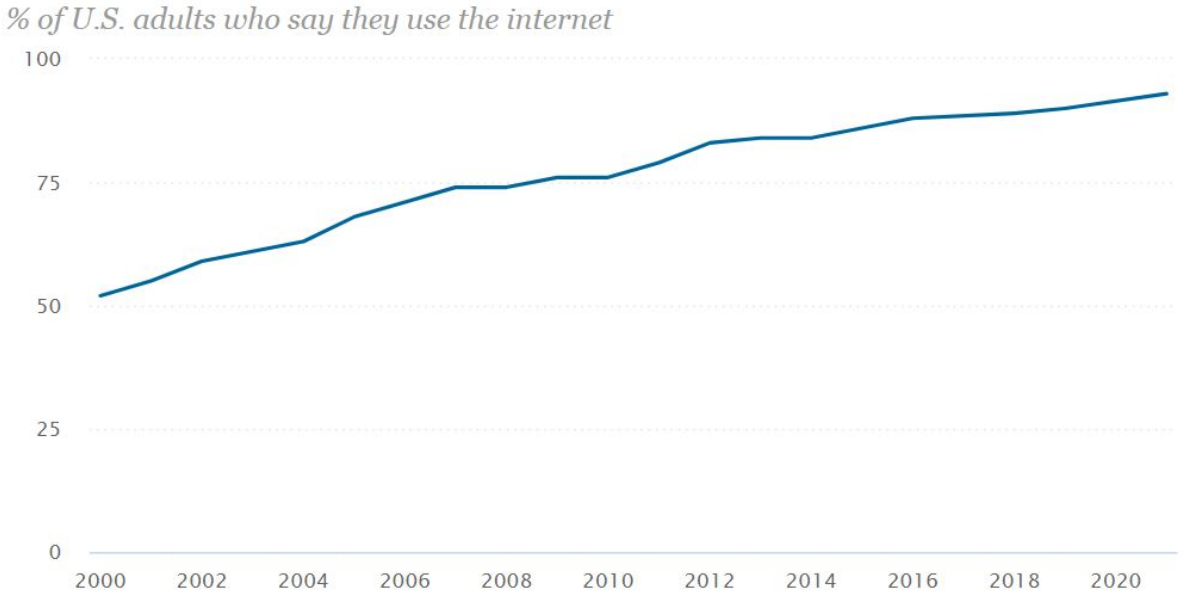
Figure 19. Live vs delayed watch time

5- How Twitch succeeded

I. Internet access

Twitch states that nearly 70% of its users are under the age of 34. Figure 20 shows survey results of Americans' usage of the internet starting from the year 2000 (Pew Research Center, 2021). By the time Twitch spun-off from JustinTV in 2011 to cater to gaming content, 79% of US adults were using the internet (compared to 55% a decade earlier), with 94% of 18-29 and 87% 30-49 demographics using it. Broadband coverage—defined by the FCC as continuous high-speed internet access (FCC, 2014)—reached 62% in 2011, according to the same Pew report. Another Pew survey conducted in 2019 revealed that 37% of American adults primarily accessed the internet through their smart phones, doubling the rate of 2013 (Pew Research Center, 2019). Figure 21 shows fixed-line and mobile internet access in Australia, OECD, and the US proportional to the population. The figure was included in a 2019 report on digital platforms by the Australian Competition & Consumer Commission where they argue

that not only did digital platforms benefit from the significant growth in internet access and penetration in the last two decades, but also that the increasing utility and appeal of digital platforms drive internet adoption (Australian Competition & Consumer Commission, 2019).



Note: Respondents who did not give an answer are not shown.
Source: Surveys of U.S. adults conducted 2000-2021. Data for each year based on a pooled analysis of all surveys conducted during that year.

PEW RESEARCH CENTER

Figure 20. Percentage of American adults using the internet from 2000-2020 (Pew Research Center, 2021)

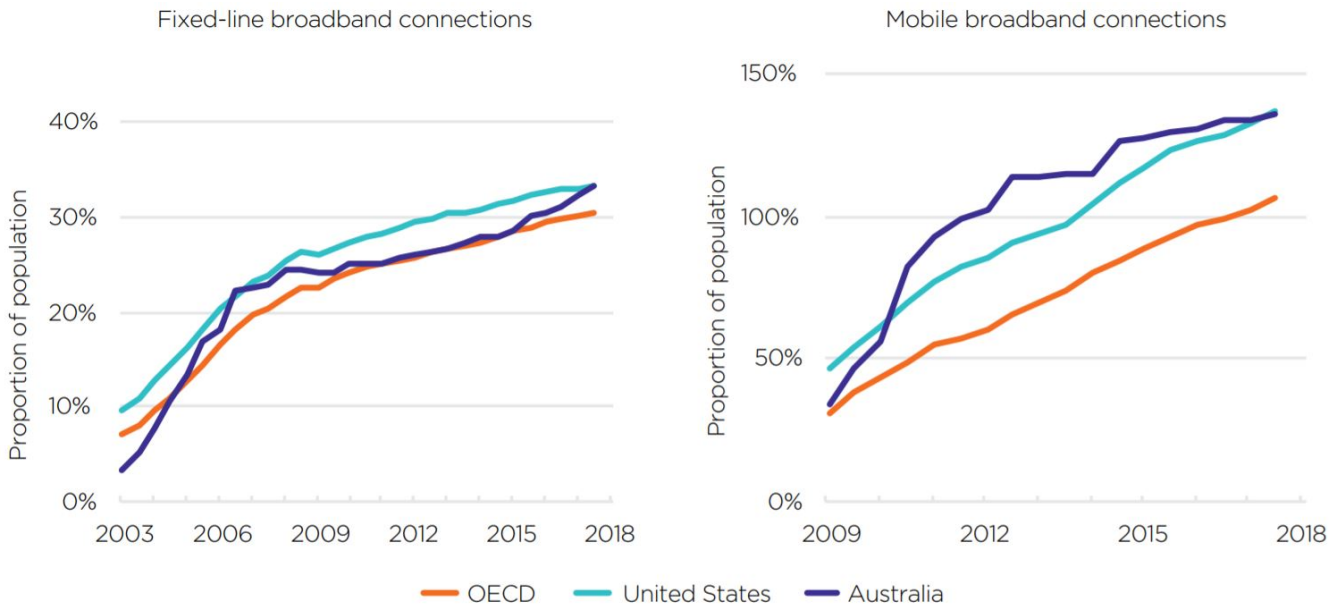


Figure 21. Fixed-line and mobile broadband coverage in the OECD, US, and Australia (Australian Competition & Consumer Commission, 2019)

II. The Demographics

The success and growth of Twitch cannot be delinked from the growth of esports which in turn stems from a passionate core demographic who grew up with video games, a medium communicating in the universal language of entertainment and competition. The internet unlocked the medium's potential as online play became possible, connecting millions of people around the world who already had corresponding interests and hobbies. Research by Nielsen in partnership with Twitch found that almost 60% of Twitch viewers had been following esports for four or more years, with 63% stating that they interact with gaming personalities on a weekly basis (Esports Playbook for Brands, 2019). Figure 22 shows additional stats reflecting viewer habits.

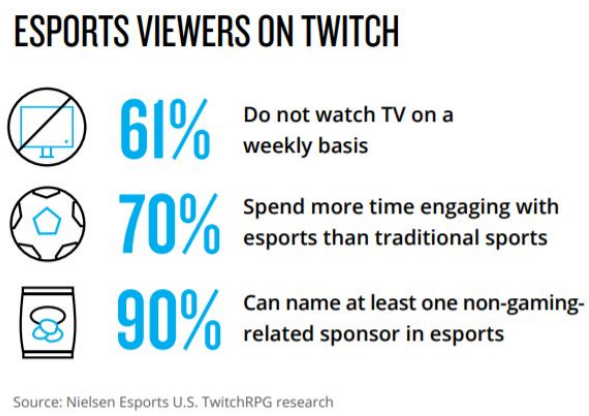


Figure 22. Demographics of esports viewers (Nielsen, 2019)

III. Communities

A. The multiplayer experience

Multiplayer functionality has existed since the dawn of videogaming. The first games of such type relied on rudimentary graphics and controllers, mainly facilitating a two-player match by either splitting the screen in two halves or having multiple players occupy the same screen with limited motion and control. As the technology became more sophisticated and computers on different networks became able to communicate with each other, Local Area Network (LAN) began to feature in video games, allowing players on separate computers to play together. As the internet further expanded its reach, LAN gaming was extended to include anyone who had an internet connection and owned the necessary hardware and software, thus facilitating online multiplayer gaming in either regional or global scale. Each iteration of multiplayer experience continues to exist to this day, with the design philosophy and objectives of each game necessitating a particular form.

The organic growth of communities centred around video games and the different interpretations of play led to a socio-technological revolution. A multiplayer experience taking place on the same device—two or more players sharing a screen—facilitates an intimate experience where individuals sharing the same interest are competing or cooperating in an engaged state towards clearly defined goals. The particular objective of a game is of little importance, since the unit of analysis is the service environment created by such medium. A LAN multiplayer game offers a different type of experience, since the players can be more distant spatially, yet still occupy the same area and with

potentially a far higher number of participants in a game. Each player joins the game from a separate device, with the possibility of creating aliases or nicknames and utilizing communication software to connect with other players. The direct experience is less intimate but more competitive, since the type of multiplayer games relying on split-screen tend to be less sophisticated and more limited than ones depending on LAN. This element compensates for the lost intimacy as competitiveness and knowledge-sharing connect players. Internet cafes and LAN parties have historically been vital contributors to the proliferation of video games and esports. An internet café facilitates the creation of relationships based on common interests and passion for video games, while LAN parties advanced the grassroots aspect of video game tournaments and laid the foundations for what would eventually become professional esports. Finally, online multiplayer removes spatial and temporal links, connecting millions of players around the globe and introducing a unique type of gaming experience. Built-in communication functionality (text and voice) as well as social software (e.g., Discord, TeamSpeak, Steam) are utilized for communication throughout the entire gaming experience. Many online games have features allowing players to create in-game groups—typically labelled clans, guilds, or teams—to facilitate relationship-building and ensure players find like-minded individuals to play with.

B. Digital distribution and modding

Digital distribution channels have also revolutionised the industry by reducing or eliminating costs associated with production, distribution, and storage of cartridges or discs, in addition to the myriad of creative and risk-management decisions tied with such expenditures. The more costs associated with releasing physical copies of video games, the safer major companies approach their design process, compromising innovativeness for tried-and-tested formulas. Digital distribution systems allowed developers to release games with little to no cost, in addition to providing review sections, forums, player ratings, and analytics to track a game's performance and userbase over the course of its existence on the platform. The platform receives a percentage of sales in exchange. This development supported the growth of independent games (Indie games) made by small teams with limited resources and also gave a subset of players who had the knowledge and capacity to modify video games a

new avenue to share their creations. This latter practice of modifying games made by other developers is commonly referred to as 'modding' and is another reflection of the gaming community's vast creative potential and unique social practices. A mod is not only a fun adjustment to an existing game, but in many cases can be the sole reason players keep coming back to play or a mean to revitalize interest in a long-forgotten game. Developers were quick to welcome modding and have since accommodated the popular practice by integrating mod functionality within their games to make accessing modified content easy or by including editing mechanics allowing players to change core design elements in a game.

C. Knowledge-sharing

Another unique attribute of video gaming communities is the high degree of involvement and multitude of ways users can actively create supplementary material to support, enhance, or fundamentally change the experience. Guidelines created by experienced players assisting newcomers in manoeuvring around the game, instructional videos, strategy tips, exploiting in-game mechanics to execute unintended actions, compiling a list of glitches and reporting feedback are some of the most prominent practices. Game developers do not have to carry the burden of introducing players to every strategic element of their games since communication takes place among players through text or voice chat, cultivating the grounds for knowledge-sharing communities. The Nonaka-Takeuchi model conveys how knowledge is created, shared, and disseminated within organizations or systems through socialization, externalization, combination, and internalization. Video game communities exhibit the same patterns since knowledge is primarily passed by experienced and more knowledgeable players through direct interaction with other players—playing together and learning by trial-and-error or producing interactive livestreams with commentary and feedback. This knowledge is then externalized by codification in textual, audio, or video forms, distilling the essential elements in an explicit manner, which is later combined with other explicit knowledge to form a collective repository of knowledge. Finally, players internalize the knowledge by applying what they have learned and gaining the necessary experience to fine-tune their skills until they reach the necessary level. Ho and Huang (2009) found that knowledge sharing not only attracts individuals

interested in the same subject matter, but it also motivates further engagement, promoting feelings of belonging and solidifying relationships in virtual communities. Additionally, the usefulness and enjoyment of content found on such communities in all its forms contribute to their effectiveness.

D. Third places

Twitch managed to tap into this established community by offering its platform as an intermediary into the world of esports. It offered professional players a platform to showcase their talents and personalities, in addition to the potential of making money by live streaming. It offered tournament organizers an unprecedented reach into millions of global fans, with analytic tools and data features to sustain growth. It offered video game players a space to not only enjoy themselves and acquire game knowledge, but also to socialize and form meaningful relationships. Hamilton, Garretson, and Kerne (2014) posit that live streams act as third places, a concept developed by Ray Oldenburg (1999) describing places where people regularly gather and socialize, distinct from home or work. Oldenburg observed that single-use zoning diminished or hindered access to third places and disrupted work-life balance, emphasizing the home as a place for entertainment and recreation. Corporations would consequently absorb and adopt the characteristics of third places to create an atmosphere conducive to their needs, whether to increase productivity by facilitating collaboration and socialization in workplaces or by marketing their businesses as third places to attract customers. Despite Oldenburg's assertion that virtual third places would not be able to replicate the same dynamics existing in their real-life equivalents, Hamilton, Garretson, and Kerne (2014) argue that live stream communities act as third places, inhibiting the same characteristics such as facilitating conversations, having regulars who set the mood and induct newcomers, being accessible, and minimizing hierarchies.

IV. Communication channels

A large subset of Twitch audience are frequent visitors of websites such as Reddit and Twitter and users of programs such as TeamSpeak and Discord. The design principle of Twitch itself replicates a long-standing formula in video gaming where game publishers

or digital distribution services integrate online chat into their software, which can take place during or outside the scope of a game (e.g., Battle.net and Steam). Twitch's precursor, JustinTV, and other livestreaming websites built their brands by exploiting this interactive functionality. Gaming audiences are particularly accustomed to chatting online, a fact well-exploited by Twitch.

Engagement with Twitch does not cease the moment a stream goes offline. What is referred to as Twitch's ecosystem is the external network of platforms hosting Twitch-related content produced, curated, and disseminated by community members. Streamers and viewers create subreddits dedicated to livestreams, sharing interesting or entertaining clips lasting from a few seconds to minutes. Discussions take place in comment sections covering the actions taking place in the clip, the recorded reaction of the chat at the time, or the commentary of the user browsing the subreddit. A universe of new interactions takes place inside these subreddits which can serve as an extension of the platform's AI, aiding discoverability and thrusting previously unknown broadcasters into fame, or ruining the careers of those negatively perceived. The seamless synchronization between Twitch's chat and video player allows for users viewing clips to watch the live reaction of the chat as the action takes place, further augmenting the experience and adding new avenues for commentary. YouTube videos are another avenue for discoverability and a great revenue stream for broadcasters who want to diversify their reach. Twitch's video on demand player is notorious for being inferior to YouTube's so some streamers choose to upload their entire streams to YouTube, and a majority upload brief highlights showcasing the most entertaining moments in each broadcast. This engagement with Twitch on external sites acts as a more in-depth extension of chat and a community-building mechanism where viewers interact with one another outside the context of a live broadcast, providing analysis and exchanging of ideas and commentary or critique.

V. Advertising

Twitch is uniquely positioned to benefit from advertising in the video gaming space as it managed to facilitate a digital platform for video game enthusiasts and casual gamers. As Twitch continues to diversify, a wider variety of brands find the platform appealing to reach a young demographic who does not engage with traditional media. Brands such

as G Fuel, Monster Energy, and Red Bull are considered endemic to the platform and have historically been successful with Twitch's demographic who is more likely to consume energy drinks and find the convenient nature of these products appealing. Other brands associated with gaming such as computer hardware or prebuilt PCs, gaming chairs, headphones, and telecommunications software have also been a mainstay for years. Non-endemic brands such as Spotify, Gillette, Cash App, and Audible have witnessed significant growth on the platform in recent years (Stream Hatchet, 2021). Mastercard and State Farm, who operate in financial services and insurance respectively, sponsored the 2018 League of Legends world championship, an event watched by 100 million unique viewers online, while Toyota sponsored North America's Overwatch League alongside Intel and HP's Omen (Esports Playbook for Brands, 2019).

6- Research

I. Methodology

A sample of 300 participants was surveyed through the sourcing platform Prolific. Ten questions gauging engagement and the quality of interaction on Twitch were administered using Google Forms. Two prescreening questions were used targeting a 18-39 age range and familiarity with gaming (Table 1). The participants were compensated at a recommended rate of £7.51/hr, aligning with Prolific's standards of ethical compensation for survey respondents. Table 2 presents the questions.

Table 1

Prescreening Questions
• How many hours per week do you play video games on average?
• How old are you?

Table 2

Survey Questions
1. How much time do you spend watching livestreams on Twitch.tv?
2. Which answer best describes your viewing habits on Twitch.tv?
3. Twitch chat is an important part of my Twitch viewing experience
4. Twitch is my primary source of entertainment
5. I am adequately familiar with Twitch emotes and memes
6. I associate Twitch with the following: (You can choose more than one answer)
7. I browse or participate in communities dedicated to Twitch personalities on other platforms (e.g., Reddit, Discord, Twitter)

8. Information provided by a Twitch streamer has informed at least one purchase decision I made
9. I find new Twitch streamers to watch through the following: (You can choose more than one answer)
10. Live streaming is a viable career path

II. Results

Respondents from 41 countries participated in the survey. After removing inconsistent and incomplete responses, 260 valid submissions remained. All valid respondents were between 18-39 years old, 71% identifying as male and 25% as female, which strongly matches the core demographic of Twitch. Among respondents, 55.7% (n=145) were students and 42.3% (n=110) were either full-time or part-time workers.

Pre-screening results and survey responses are shown in Table 3 and Table 4.

Table 3

Prescreening Responses	
How many hours per week do you play video games on average?	• 33.1% (n=86) →13 hours or more • 21.2% (n=55) →3-6 hours • 19.2% (n=50) →10-12 hours • 15% (n=39) →6-9 hours • 11.5% (n=30) →0-3 hours
How old are you?	• 100% (n=260) →18-39

Table 4

Survey Responses	
1. How much time do you spend watching livestreams on Twitch.tv?	• 40.7% (n=106) 1 hour or less per week • 40.4% (n=105) 2-3 hours per week • 18.8% (n=49) 7 hours or more per week
2. Which answer best describes your viewing habits on Twitch.tv?	• 61.5% (n=160) I mostly watch the livestream • 22% (n=57) I listen to Twitch in the background • 16.5% (n=43) I actively participate in Twitch chat while watching a livestream
3. Twitch chat is an important part of my Twitch viewing experience	• 35.8% (n=93) Agree • 31% (n=81) Neutral • 17% (n=44) Strongly agree

	• 10.8% (n=28) Disagree • 5.4% (n=14) Strongly disagree
4. Twitch is my primary source of entertainment	• 82.7% (n=215) Disagree • 17.3% (n=45) Agree
5. I am adequately familiar with Twitch emotes and memes	• 43.5% (n=113) Agree • 26.2% (n=68) Strongly agree • 18.8% (n=49) Neutral • 9.2% (n=24) Disagree • 2.3% (n=6)% Strongly disagree
6. I associate Twitch with the following: (You can choose more than one answer)	• 94.6% Video games • 52.4% Game shows and podcasts • 44.4% Socialization • 15.2% Music
7. I browse or participate in communities dedicated to Twitch personalities on other platforms (e.g., Reddit, Discord, Twitter)	• 52.3% (n=136) Agree • 47.7% (n=124) Disagree
8. Information provided by a Twitch streamer has informed at least one purchase decision I made	• 56% (n=146) Disagree • 44% (n=114) Agree
9. I find new Twitch streamers to watch through the following: (You can choose more than one answer)	• 73.4% (n=191) External platforms • 46.9% (n=122) Friends • 42.6% (n=111) Interactions with the streamers I watch • 37.3% (n=97) Recommended channels by Twitch
10. Live streaming is a viable career path	• 42.3% (n=110) Agree • 27.3% (n=71) Neutral • 16.5% (n=43) Strongly agree • 11.9% (n=31) Disagree • 1.9% (n=5) Strongly disagree

Pre-screening question: Video game play time

Pre-screening results of respondents' video game play time per week are shown in *Figure 23*.

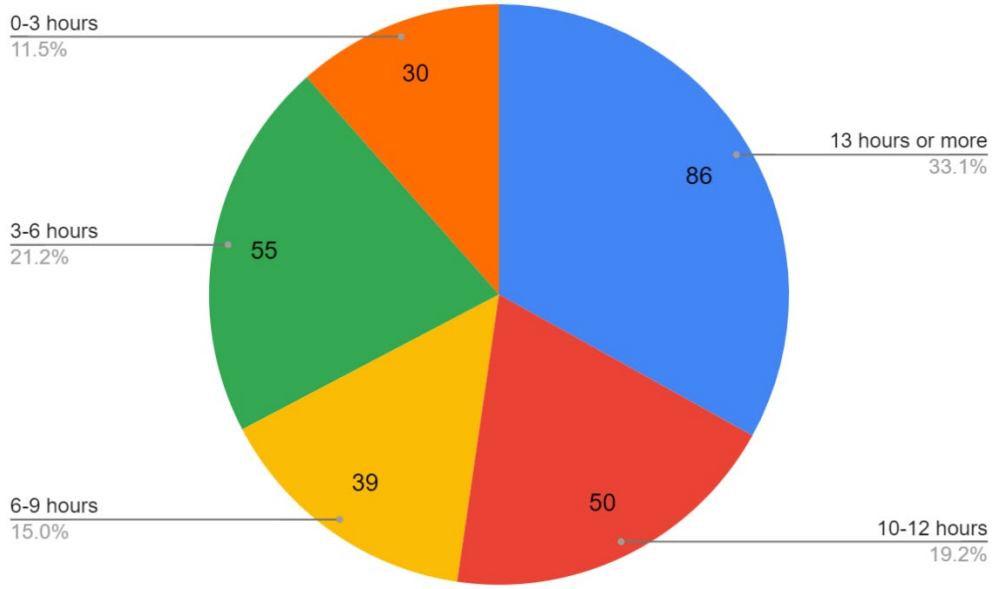


Figure 23. Prescreening results for video game play time/week

Q1- Twitch view time

The vast majority of respondents (81.1%, n=211) view Twitch between 1 hour or less and 2-3 hours per week, with a nearly identical number of respondents in both groups (*n*=106 and *n*=105), while 19% (n=49) view Twitch more than 7 hours per week (*Figure 24*). Longer view time on Twitch is positively correlated with increased familiarity with the platform's unique communication language (memes and emotes) and higher significance of chat as an essential element influencing the experience (*Figure 25*).

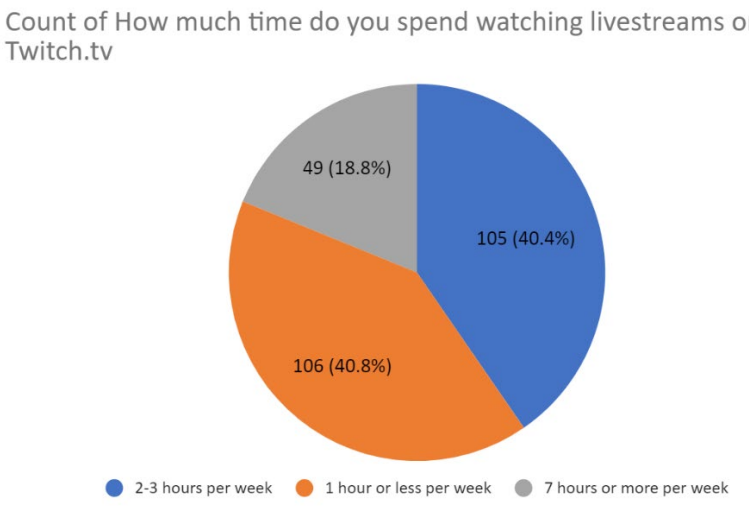


Figure 24

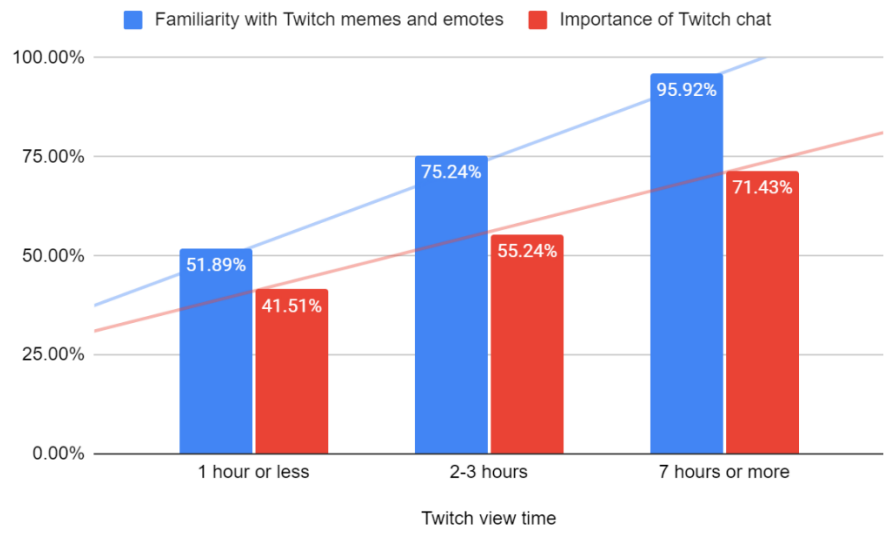


Figure 25

Q2- Viewing habits

The majority of Twitch viewers (61.5%) mostly watch the livestream, while 21.9% listen in the background and 16.5% actively participate in chat while watching (*Figure 26*). Respondents with more active viewing habits made more Twitch-informed purchase decisions (*Figure 27*).

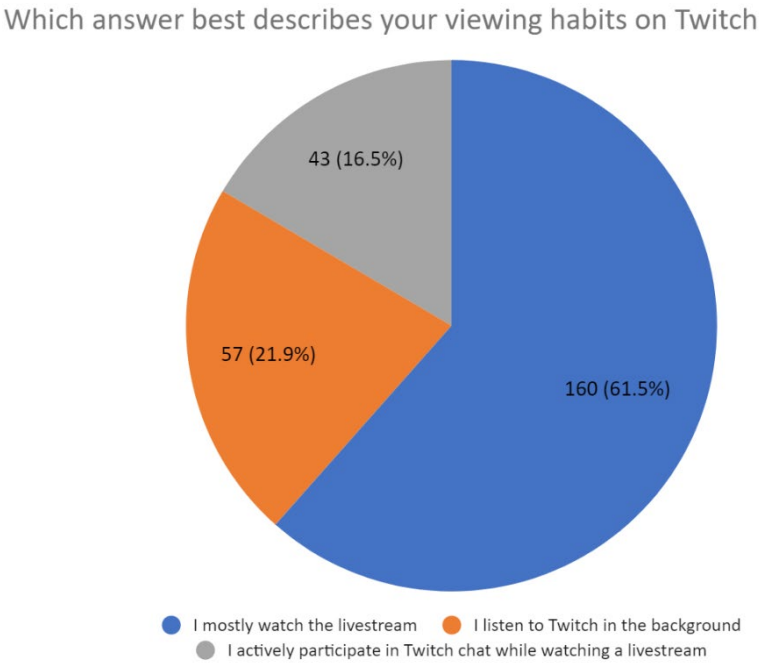


Figure 26

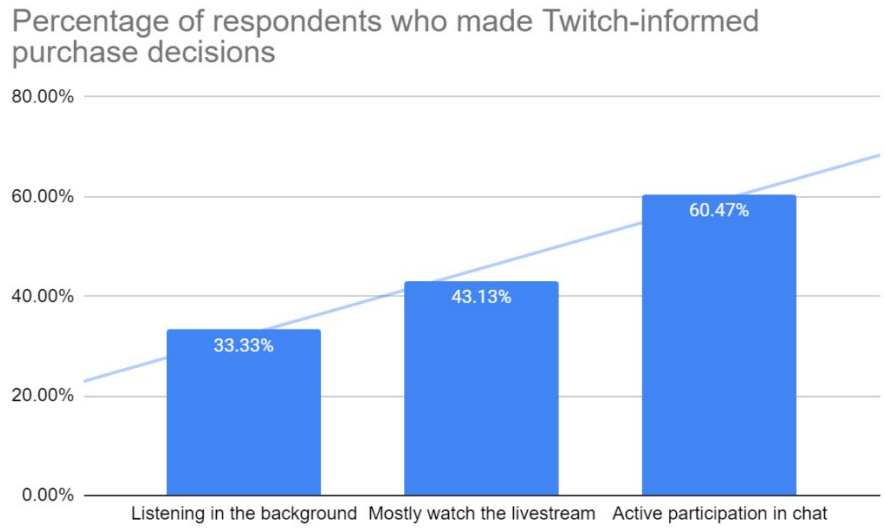


Figure 27

Q3- Significance of chat to the experience

Around 35.7% (n=93) of respondents strongly agree Twitch chat is important to their experience, while 31% are neutral (*Figure 28*). Aggregating all positive responses

reveals 52.7% (n=137) of respondents consider Twitch chat an important part of their experience (*Figure 29*).

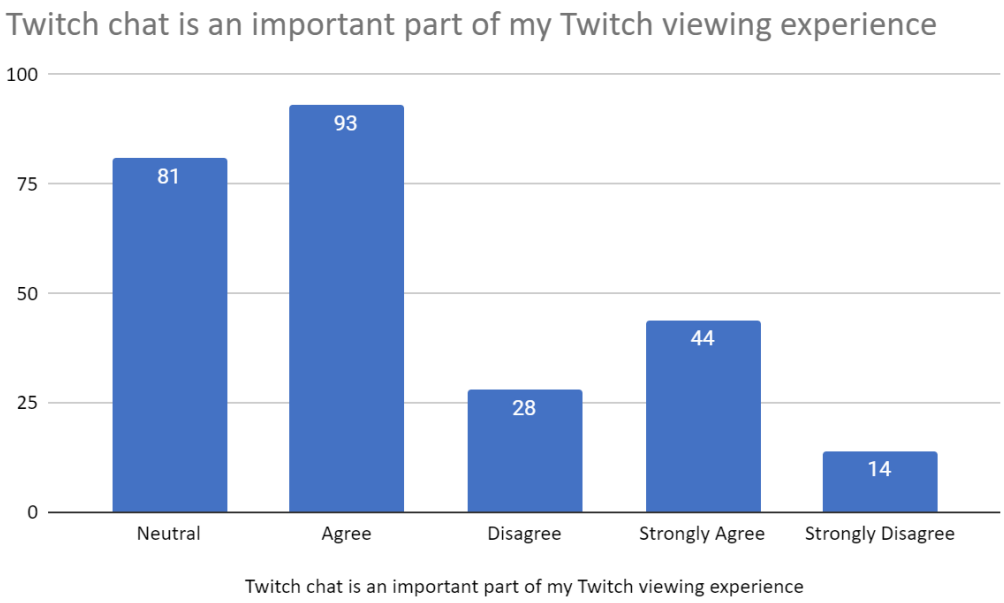


Figure 28

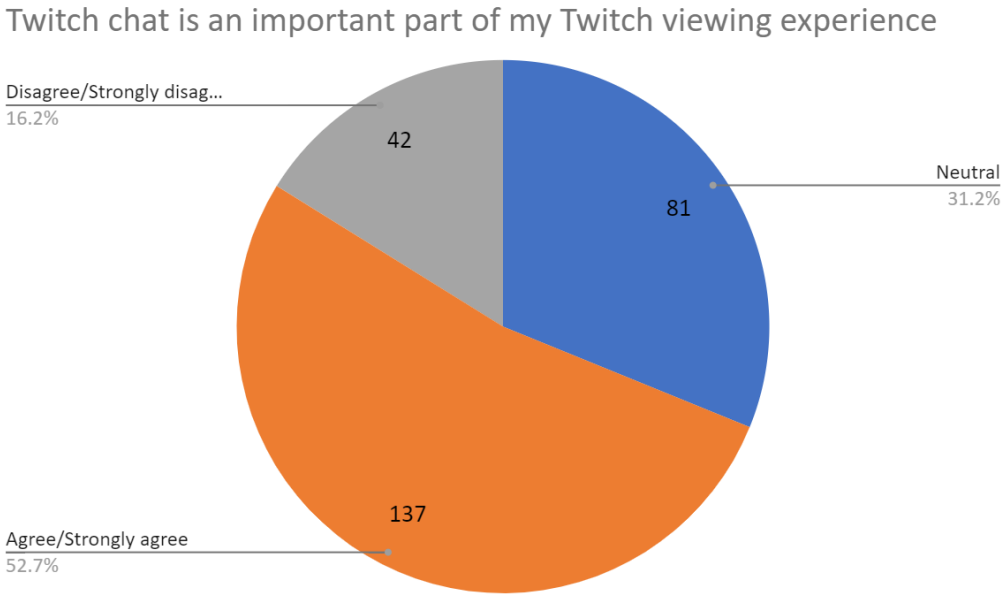


Figure 29

Figure 30 shows the correlation between familiarity with memes and importance of chat to the experience. Familiarity with memes and emotes increases as chat becomes more important.

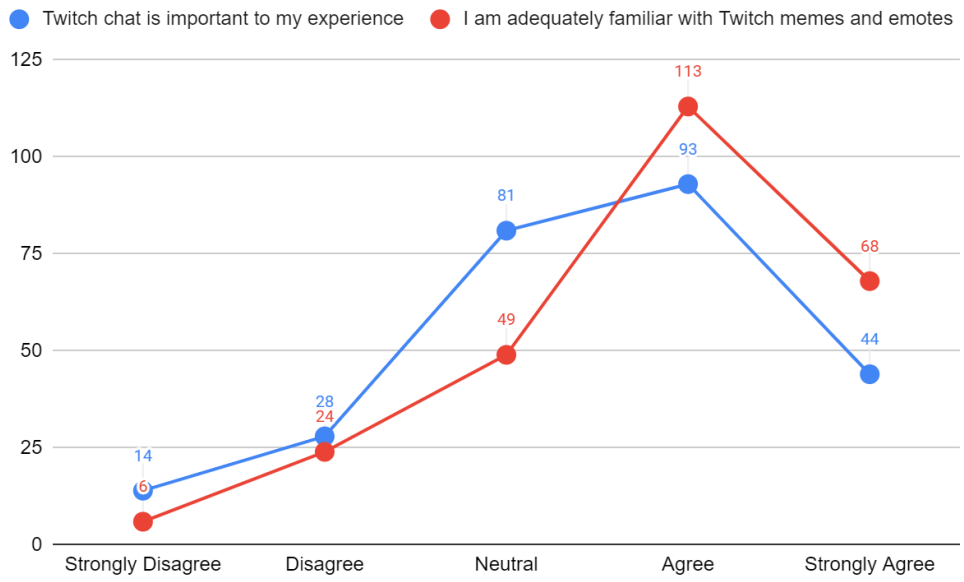


Figure 30

Q4- Twitch as a primary source of entertainment

Twitch is the primary source of entertainment for 17.3% (n=45) of respondents (*Figure 31*).

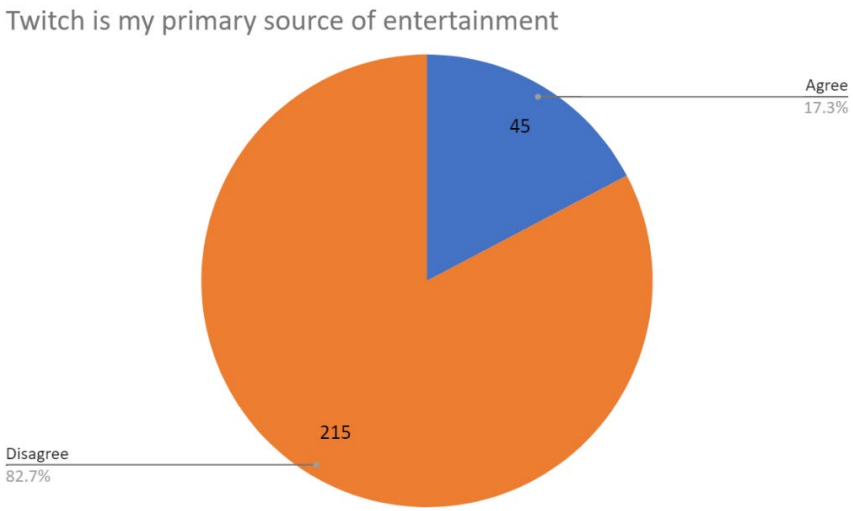


Figure 31

The percentage of respondents considering Twitch their primary source of entertainment increases with weekly Twitch view time (*Figure 32*).

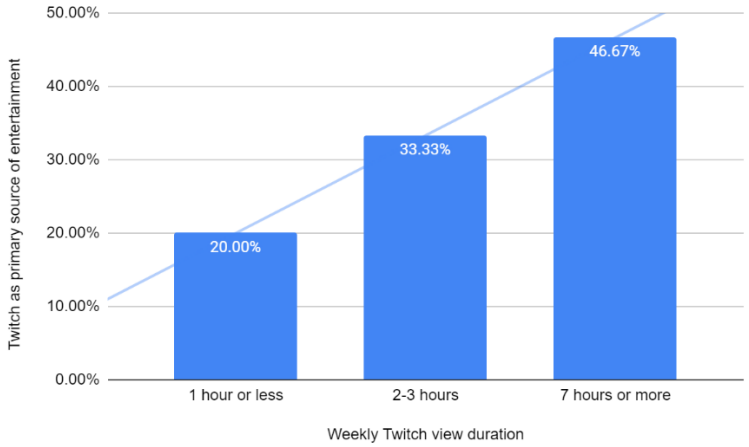


Figure 32

Q5- Familiarity with memes/emotes

Respondents are highly familiar with Twitch memes and emotes (*Figure 33*). Aggregating positive responses shows a 69.6% (n=181) familiarity with memes and emotes (*Figure 34*).

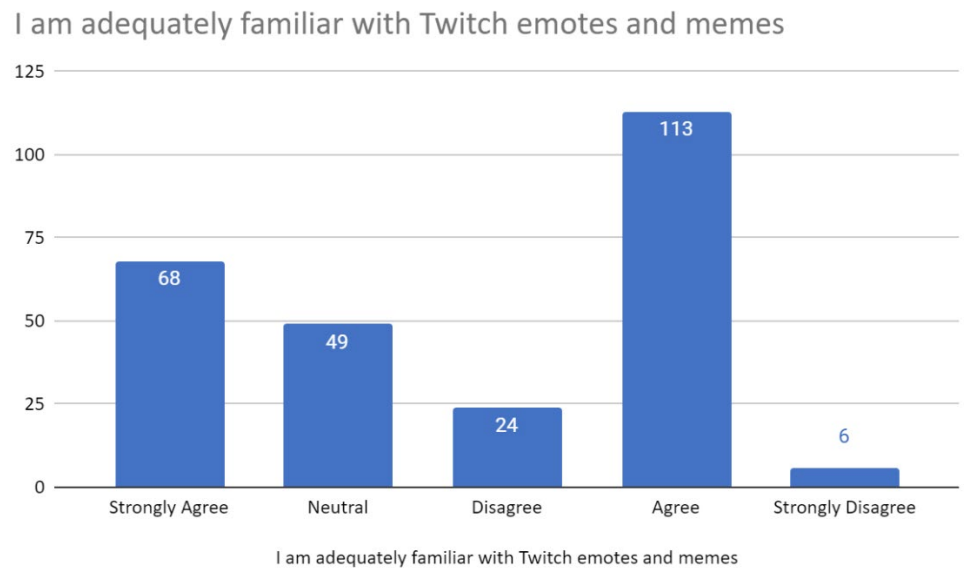


Figure 33

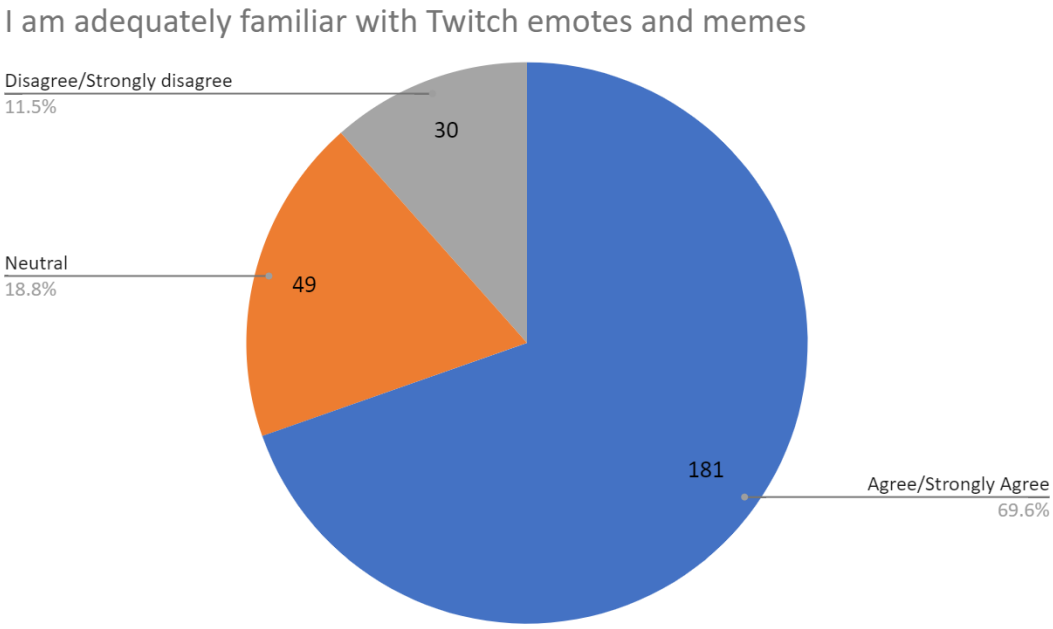


Figure 34

Q6- Association with Twitch

Video games are strongly associated with Twitch (95.7%, n=249). Game shows and podcasts (53%), socialization (45%), and music (15.3%) top the list (*Figure 35*).

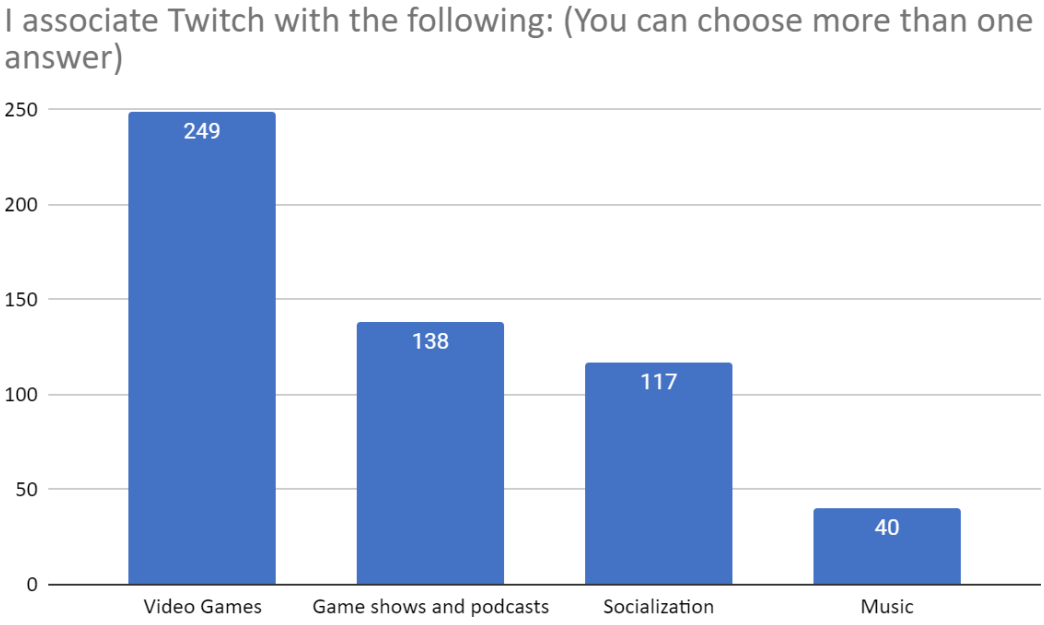


Figure 35

Q7- External Twitch-dedicated communities

The majority of respondents (52.3%, n=136) participate in external communities dedicated to Twitch (*Figure 36*).

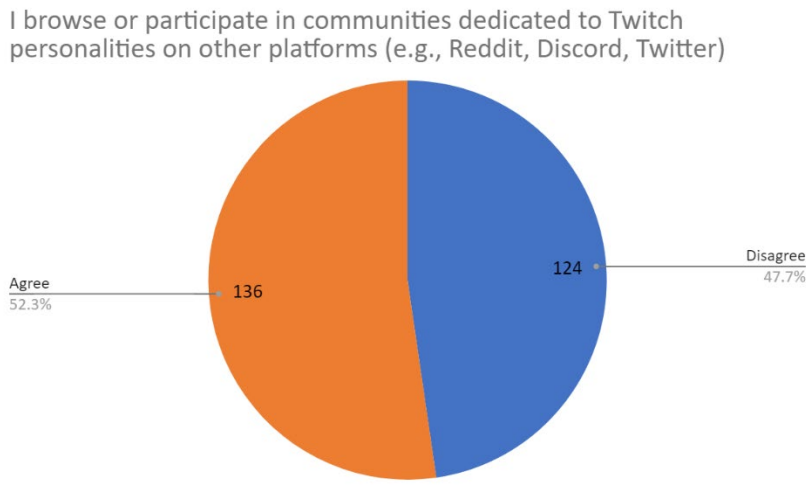


Figure 36

Q8- Twitch-informed purchase decisions

Twitch streamers have informed at least one purchase decision of 44% (n=114) of respondents (*Figure 37*).

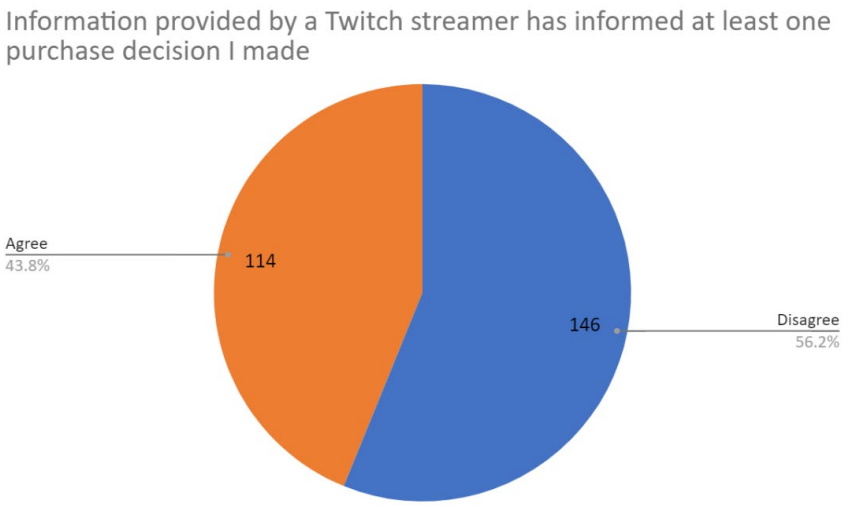


Figure 37

Figure 38 shows the correlation between Twitch-informed purchase decisions and importance of Twitch chat to the experience.

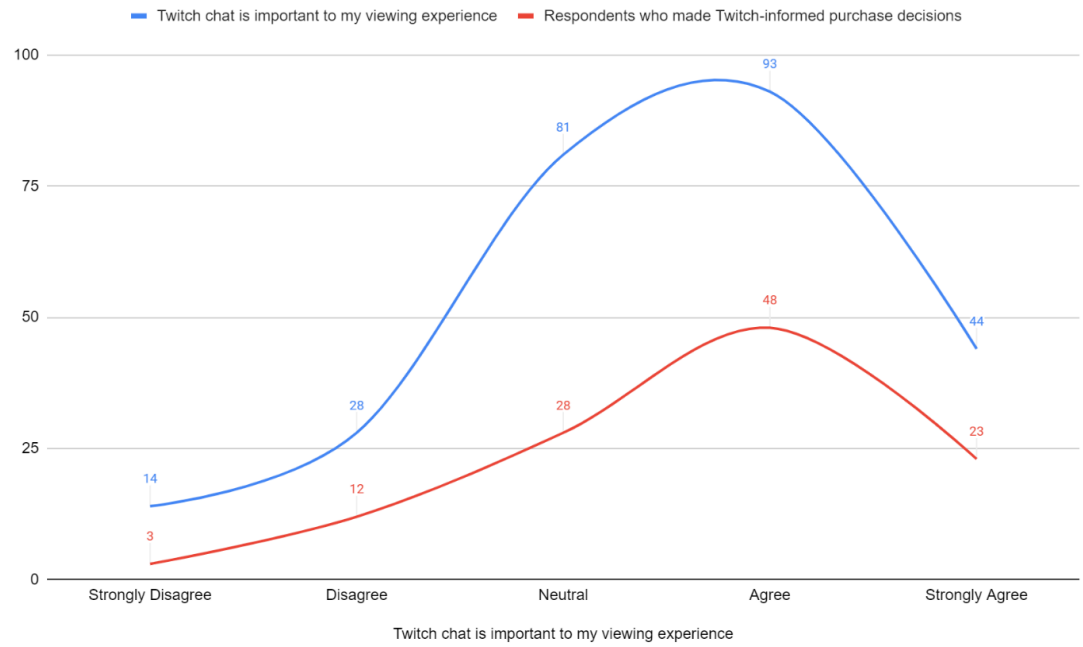


Figure 38

Q9- Discoverability and recommendations

The vast majority of respondents (73.4%, n=191) find new streamers to watch through external platforms. Friends (47%), interactions between streamers (42.6%), and

recommended channels by Twitch (37.3%) comprise the remaining responses (*Figure 39*).

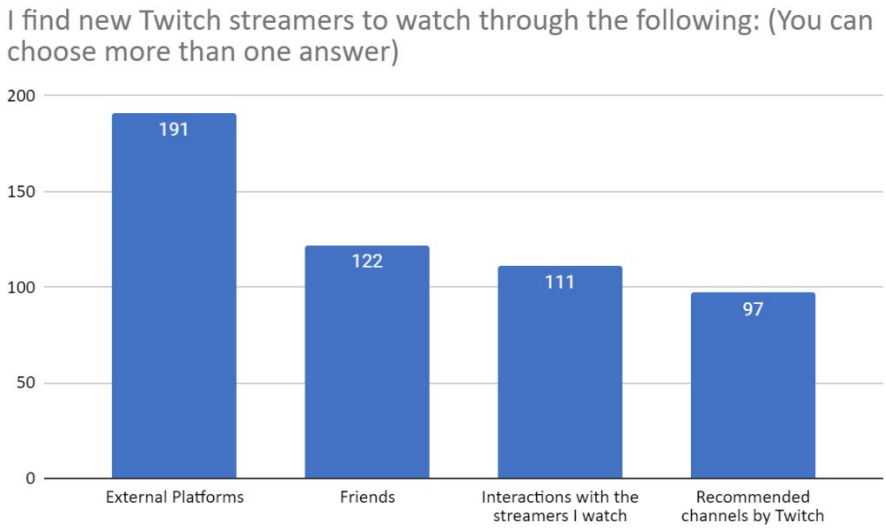


Figure 39

Q10- Livestreaming as a career

42.3% of respondents agree livestreaming is a viable career path(Figure 40). Aggregating all positive responses reveals 58.8% (n=153) consider livestreaming a viable career path (*Figure 41*).

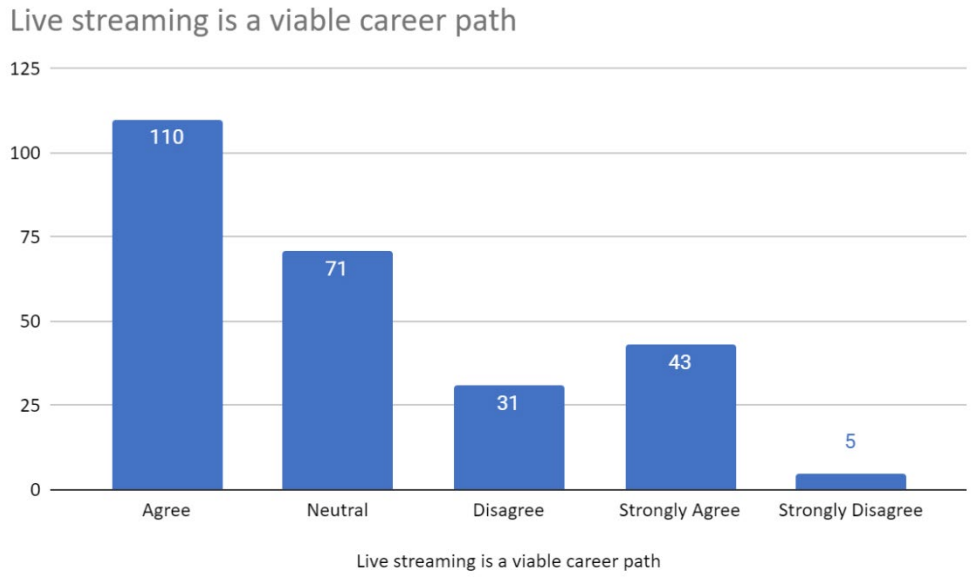


Figure 40

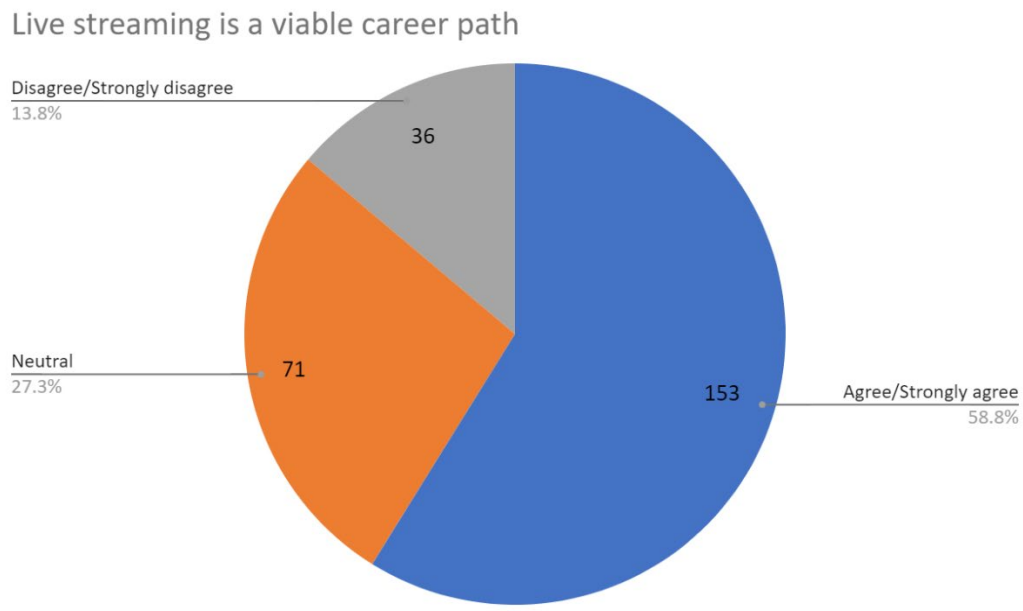


Figure 41

III. Discussion

Social practices increase as users spend more time on Twitch, evidenced by the corresponding increase in familiarity with memes and emotes as well as importance of Twitch chat to the experience. This social factor becomes inseparable from the experience and a proxy for gauging the degree of engagement with livestreams and

streamers themselves. Brands running advertisements or sponsoring content on livestreams should have Twitch accounts with distinguishable names and representatives who actively engage with viewers and streamers during sponsored events as such interactions are often circulated on external platforms, generating commentary and spiking interest in brands. Since advertisements on Twitch are disruptive to the flow of livestreams and can be blocked through browser extensions, streamers see more financial gain from incentivizing donations, making them highly adept at calls to action. Collaborating with middle-sized and top streamers not only allows access to their communities but generates more value through commentary and information-sharing on external platforms. Experienced Twitch users who are familiar with esports and the personalities on Twitch are essential in bridging the gap between advertisers and viewers, especially in a demographic that assigns high value to authenticity.

More active viewing habits and importance of chat to the experience correlate with making Twitch-informed purchase decisions. Active viewing habits are indicative of trust in a streamer's opinion, having positive relationships with a streamer's community, and higher tendency to financially support the streamer by donating. Users who are more attentive and participative during streams are also more likely to make the decision to purchase a product seen or heard of during a stream. Brands can diversify their sponsorships or promotions by engaging viewers in the chat through participative competitions requiring viewer contribution or giveaways dependent on chat interaction.

Despite the predominant association with videogames, a diverse range of content is found on Twitch, evidenced by the most viewed category not being videogame-centered. The strong commentary and socialization aspects are present in survey responses as well as the practices of top streamers. Exploiting the vast communities supporting streamers is crucial to the success of any brand on Twitch, but since backlash is quick to grow out of proportion online, transparent and active communication with streamers and viewers is crucial. Industry consultants offering insight and analysis on trends and best practices are a highly valuable niche and entities that can fulfil such a role are best positioned to exploit the surge in interest.

The majority of respondents find new streams to watch on external platforms (73.4%), but only 52.3% of respondents browse or participate in external communities dedicated to Twitch. Respondents who find new Twitch streamers through YouTube recommendations or clips might not consider their engagement to involve browsing or participation in a Twitch-dedicated community. It might also mean that Twitch-related content seeps into mainstream discussions and can be found outside of Twitch-centered communities on social media and online news websites. Recommendations on external platforms are more valuable than Twitch AI recommendations because they create additional avenues for content generation through commentary and knowledge-sharing. Brands can exploit this by maintaining an active presence on external platforms and targeting streams receiving the highest engagement, which requires consistent monitoring of these external platforms and having knowledgeable and experienced staff.

Opportunities in the Twitch sphere cannot be delinked from those in esports or video games in general. Aside from directly approaching streamers, brands can host amateur or professional tournaments, either online or in-person. Revenue is generated through ticket sales, media rights, merchandise, and sponsorships. While the biggest tournaments in popular games are usually hosted by game publishers themselves, smaller tournaments are often partly or entirely funded by third parties and tend to cater to local players. Additionally, established companies can collaborate with game publishers to provide microtransactions, offering unique cosmetic items to players, an extra source of revenue for publishers, and invaluable promotional space for brands. Luxury fashion brands such as Louis Vuitton, Valentino, Burberry, and Balenciaga have collaborations with video game publishers promoting in-game items as well as their real-world counterparts. Another avenue is sponsoring teams dedicated to esports or content creation, the latter which has been on the rise in the past years. Individuals in such teams reside in one big house and practice or collaborate with each other, creating a highly conducive environment for content creation and product promotion through regular live streams, organized events, and recorded videos. Moreover, marketing agencies and analytics providers are increasingly needed as non-endemic companies looking for opportunities in the industry seek support. Demand is also high for dedicated software solutions to streamline and personalize live broadcasts as streamers look to differentiate themselves. In addition to content creators or professional players,

some teams hire coaches, psychologists, and managers, while creators themselves have personal agents and editors. All of these positions are in flux as the industry continues to grow, opening the space for experienced individuals to exploit the surge in demand.

Twitch-informed purchase decisions were made by 44% of respondents in the survey. Translating this into numbers, daily Twitch visitors in 2021 averaged 31 million users, according to the company's internal data. As the leading livestreaming platform, Twitch's hold on this ever-growing segment is an invaluable asset to businesses and stakeholders. Brands that can solidify their presence on Twitch earlier than others will be able to form long-lasting relationships with streamers and viewers, and subsequently convert a large number of viewers into loyal clients and ambassadors for their brands.

IV. Limitations and future research

The survey was limited to 10 questions in order to provide adequate and ethical compensation for participants. Prolific does not have direct access to Twitch users so familiarity with video games was used as one of the two prescreening questions as a proxy for familiarity with Twitch owing to the strong association between the two. However, this might impact responses, as potentially seen in the 6th question. Causal relationships between variables are beyond the scope of this paper and additional research should be carried out to ascertain the causality between different variables.

Future research can highlight the business model aspect of digital livestreaming platforms, tracking how competition between the biggest companies impacts revenue streams and the nature of contracts and exclusivity in the livestreaming sphere, especially as other companies expand and refine their offerings. Another area of interest is how non-endemic brands can effectively leverage live streamers to drive engagement and conversion rates.

7- Conclusion

A survey was conducted to understand the consumption habits of Twitch users and their interaction with the platform and its associated communities and services. The results reveal that social practices on Twitch positively correlate with time spent on the

platform and act as a proxy for gauging engagement. Purchase decisions correlate with active viewing habits and importance of the chat function to the experience. The predominant discovery mechanism for new livestreams was through external platforms.

Opportunities on Twitch are an extension of those in the videogame industry as a whole, and demand is high not only for experienced agents, managers, coaches, analytics, and industry consultants, but also for investments in tournaments and team houses, collaborations with game publishers, and software solutions for creators and viewers.

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