

BUS326 GLOBAL SUPPLY CHAINS INDIVIDUAL ASSIGNMENT **2024-25**

BRIEFING PAPER FOR SONY INTERACTIVE ENTERTAINMENT (SIE) IN THE PLAYSTATION 5 SUPPLY CHAIN

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Executive Summary

The PlayStation 5 (PS5) supply chain showcases the complexities of the electronics global value chain, with Sony Interactive Entertainment (SIE) as the lead firm and the stakeholder of this report. SIE manages core competencies such as product innovation and brand leadership while outsourcing non-core activities such as microchip design and assembly to contract manufacturers, including AMD, TSMC, and Foxconn. However, the chain faces critical challenges.

Firstly, the semiconductor manufacturing industry is highly oligopolistic, with SIE reliant on TSMC for chip fabrication. External disruptions, such as COVID-19 and geopolitical tensions, exacerbate supply chain vulnerabilities, limiting diversification options due to high capital costs for the establishment of fabs. Second, upstream issues like the sourcing of conflict minerals from the Democratic Republic of Congo (DRC) pose reputational risks, despite SIE's ethical commitments.

To mitigate these issues, this report recommends SIE managers to invest in cloud gaming infrastructure, reducing dependency on physical consoles and suppliers. While challenging, this recommendation could enhance long-term resilience for the electronics value chain and transform the gaming industry.

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Background

Characterising the Supply Chain

According to Gereffi and Fernandez-Stark (2019. p. 54), analysing a supply chain through the Global Value Chain (GVC) framework, "allows one to understand how global industries are organized by examining the structure and dynamics of different actors involved in a given industry". By applying this framework to the Sony PlayStation 5 (PS5) supply chain using a *top-down* approach, we gain a comprehensive view of the electronics GVC and its inherent complexities.

Sturgeon and Kawakami (2010, pp. 9-11) describe the concept of *value chain modularity* in the electronics industry, explaining how standardised components enable the geographic dispersion of production. Utilising the typological frameworks of Sturgeon and Lee (2001), Sturgeon (2002) and Sturgeon and Kawakami (2010), the PS5 supply chain is effectively characterised.

Sony Interactive Entertainment (SIE) is a key actor in the chain, serving as the *lead firm* that governs the GVC. As the owner of the PlayStation brand and primary orchestrator of the PS5's production, SIE plays a critical role by placing orders, defining specifications, and overseeing the chain's strategic direction (Sturgeon and Kawakami, 2010, p. 11). *Contract manufacturers*, dispersed globally, "make products for lead firms and sometimes provide design services" (Ibid, p. 13). For example, AMD, an imperative contract manufacturer, functions as a *turn-key supplier* (Sturgeon and Lee, pp. 8-9; Sturgeon, 2002, p. 455). AMD is responsible for designing the PS5's custom microchips, but outsources the fabrication of these chips to TSMC in Taiwan, highlighting the modular nature of the chain (see Appendix A for a detailed breakdown).

However, the PS5's GVC is not purely modular. While modularity historically enabled firms to "switch and share contractors", today's more complex and less standardised relationships, particularly with turn-key suppliers like AMD, lead to "buyer-supplier lock-in" (Gereffi, Humphrey and Sturgeon, 2005, p. 95). AMD's involvement in research and development and access to intellectual property makes switching suppliers difficult for SIE (Sony Interactive Entertainment, n.d.). Conversely, contract manufacturers, such as Foxconn in China, which handle the assembly of PS5 units (Chan, Pun and Selden, 2020), are more replaceable due to the standardised and labour-intensive nature of their role.

Brief History of the Supply Chain

Since its launch in November 2020, the PS5 has achieved over 65 million hardware unit sales globally as of September 2024 (Sony Interactive Entertainment, 2024). However, its initial years were confronted by severe supply chain disruptions, driven by COVID-19, semiconductor shortages and an evergrowing demand for electronics (Batchelor, 2023; Gerken, 2023). This impact was significant enough that the PS5 undersold the PS4 in its second year (Sony Interactive Entertainment, 2022). As aforementioned in the previous section, contract manufacturers like TSMC operate within an oligopoly of microchip fabricators (Borrachero Prieto, 2022), making them a critical yet constrained link in the electronics GVC. The combination of high demand and pandemic-induced disruptions triggered the *bullwhip effect* (Swelyn, 2008), creating bottlenecks in the chain. Furthermore, this vulnerability highlights Gereffi, Humphrey and Sturgeon's (2005) aforementioned '*buyer-supplier lock-in*', as SIE's reliance on TSMC for microchips made it difficult to switch suppliers. By late 2023 the issue had partially subsided, with factors such as industry adaptation, and TSMC expanding production capacity (TSMC, 2024) to achieve supply chain resilience.

Further upstream in the supply chain, the extraction of raw materials plays an important role in the broader electronics GVC (refer to Appendix A). Minerals such as cobalt, sourced predominantly from the Democratic Republic of Congo (DRC), are essential for manufacturing consumer electronics, including the PS5. However, these minerals have been historically labelled as *'conflict minerals'* and earn this reputation for funding violence and inhumane treatment in the DRC (Epstein and Yuthas, 2011, p. 13). To address these concerns, the Sony Group Corporation has implemented initiatives such as the *Sony Group Policy for Responsible Supply Chain for Minerals* (Sony Group Corporation, 2021). These policies emphasise ethical sourcing and compliance with international standards, highlighting SIE's role as the lead firm in the chain.

Current State of the Supply Chain

The exploration of the PS5 supply chain structure and historical context reveals two critical issues shaping its current state:

1. Challenges in Semiconductor Manufacturing

The semiconductor manufacturing industry remains highly oligopolistic, with the global microchip shortages being exacerbated by events such as COVID-19 and the Ukraine-Russia war (Borrachero

Prieto, 2022; Mohammad, Elomri, and Kerbache, 2022; Chandler, 2022). The industry's inherent complexity stems from its capital-intensive nature, with significant costs for establishing and maintaining fabs (Mohammad, Elomri, and Kerbache, 2022, p. 479).

As SIE relies on TSMC for microchip fabrication, this dependence on Asian manufacturers from Taiwan and China limits the establishment of fabs in Europe or North America due to high initial costs (Borrachero Prieto, 2022). While governments are advocating for localisation initiatives, such as investing in domestic semiconductor manufacturing (Mohammad, Elomri, and Kerbache, 2022, p. 480), such proposals face heavy challenges — setting up fabs could require \$800 billion USD in capital expenditure alone (Ibid, p. 481). Alternative approaches, such as Tesla's strategy to develop in-house microchips while ensuring compatibility with third-party suppliers (Ibid, p. 480), demonstrate potential pathways to supply chain resilience. However, Vargas et al. (2021) argues that while these solutions appear viable on paper, their execution is far from straightforward, leaving the industry largely constrained by its current structure and system.

2. Upstream Issues: Conflict Minerals

The extraction of conflict minerals, particularly in the Democratic Republic of Congo (DRC), remains a dominant concern within the electronics GVC. Sony Group's policy for the responsible supply chain of minerals emphasises collaboration with the Responsible Business Alliance (RBA) to promote the social and economic welfare of upstream actors (Sony Group Corporation, 2021). Additionally, Sony's 2024 sustainability report highlights the deployment of auditing measures aimed to ensure ethical mineral sourcing from upstream actors like smelters (Sony Group Corporation, 2024).

However, Epstein and Yuthas (2011) argue that the complexity of the electronics supply chains makes verifying the origins of conflict minerals highly challenging, rendering traditional practices, namely auditing, insufficient. This concern is exemplified by the Congolese government's lawsuit against Apple for allegedly using conflict minerals (Ross, 2024). While Sony (and SIE) claim to enforce rigorous auditing practices, the inherent opacity of multi-tiered supply chains raises questions about their effectiveness. It is possible that these initiatives serve more as public-relations strategies than actionable solutions to systemic issues.

The Stakeholder

Identity and Role in the Chain

Sony Interactive Entertainment (SIE) is a subsidiary of the Sony Group Corporation, a publicly traded multinational conglomerate. As the lead firm in the PS5 supply chain, SIE orchestrates chain operations by focusing on core competences and non-core capabilities (Davis, Kaplinsky, and Morris 2018, p. 51). By extension, Porter's (1990, pp. 49-50) cited by Gereffi and Korzeniewickz (1994, p. 6) value chain framework emphasises the management of lower and higher-order competitive advantages by lead firms across the supply chain.

Following this understanding, we achieve a clearer picture of the identity and role of SIE, specifically their management (see Figure 1). SIE's core competences/higher-order competitive advantages include the management of the PlayStation brand and hardware such as the PS5. For example, its PlayStation Studios division comprises of different studios and IPs that SIE manage and drive consumer loyalty and innovation. Conversely, their non-core capabilities/lower-order competitive advantages, such as the design and fabrication of microchips by AMD and TSMC and assembly of PS5 consoles by cheap labour in the Global South, helps minimise SIE's operational costs, and allows them to focus on strategic activities.



ecosystem, including exclusive titles from PlayStation Studios such as Marvel's Spider-Man 2 and The Last

Designing and specifying the PS5 product line (PS5, PS5 Slim, PS5 Pro) architecture and specification amongst other products such as

Custom APU microchip designs by

Outsourced to contract manufacturers

like Foxconn in China, leveraging cheaper labor in the Global South.

Figure 1. Sony Interactive Entertainment's (SIE) identity and role in the PS5 supply chain.

Stakeholder Interests and Relations

As a publicly traded company in the competitive electronics and video games industry, SIE's primary interest lies in profit maximisation. Fundamentally, this implies lowering costs. To achieve this, SIE's management, as the lead firm of the PS5 supply chain, strategically outsources work to contract manufacturers. By leveraging the Global South for labour and capital-intensive activities such as assembly or sourcing expertise and technological economies of scale (e.g., chip production by AMD and TSMC), SIE minimises operational costs. Palpacuer (2008) describes this as the process of *financialization*, where equity markets drive the distribution of power, risks, and wealth across supply chains. In this model, shareholders become the most influential stakeholders, and managers are tasked with delivering returns. (Ibid, pp. 398–399). For producer-driven chains like the PS5, these dynamics heavily shape supply chain decision-making, as SIE prioritises shareholder interests above others.

However, these interests often conflict with those of other stakeholders. Palpacuer (2008, p. 401) notes that lead firms comprise of profit-oriented elites sitting at the top of the chain, while the base is "defined as the most deprived social groups". This is evident in the Global South, where contract manufacturers like Foxconn are known for exploitative labour practices, triggering protests among labour unions (Miller, 2022). While SIE's Supply Chain Policies (Sony Corporation Group, 2024) suggest a commitment to ethical practices, meaningful improvements to working conditions would likely require higher supplier payments, potentially reducing profitability. A similar narrative persists with sourcing 'conflict minerals' within the Democratic Republic of Congo (DRC), where inhumane practices persist despite SIE's stated 'commitments' to responsible sourcing.

Additionally, SIE must navigate complex relationships with states and institutions, as governments often prioritise economic and social upgrading. For instance, the United States introduced the CHIPS and Science Act (2022) to incentivise domestic semiconductor manufacturing (The White House, 2022). While this supports economic upgrading goals (Barrientos, Gereffi, and Rossi, 2011, pp. 323–324), the higher operational costs associated with U.S.-based manufacturing may be passed down to turn-key suppliers like AMD and ultimately to SIE, creating conflicting interests.

Stakeholder Challenges

The oligopolistic nature of the semiconductor manufacturing industry, combined with the aftermath of COVID-19 and the ongoing Ukraine-Russia war, directly impacts SIE's ability to maintain a steady supply of microchips for the PS5. SIE's heavy reliance on TSMC, an Asian-based manufacturer, exposes the company to risks associated with supply chain bottlenecks and geopolitical instability. This dependency limits its flexibility to diversify suppliers, particularly as the high costs of establishing fabs in Europe or North America make local sourcing impractical (Mohammad, Elomri, and Kerbache, 2022, p. 481). For SIE's managers, this poses a significant challenge in ensuring consistent production while keeping costs competitive. The limited feasibility of alternative strategies, such as developing in-house microchips akin to Tesla's approach (Mohammad, Elomri, and Kerbache, 2022, p. 480), adds further strain, leaving SIE constrained by the existing structure of the semiconductor industry.

Furthermore, the extraction of conflict minerals from the Democratic Republic of Congo (DRC), poses reputational and operational challenges for SIE. Although Sony's collaboration with the Responsible Business Alliance (RBA) and its 2024 sustainability report emphasise ethical sourcing and auditing measures, the inherent complexity of electronics GVCs makes it difficult to verify the origins of these minerals (Epstein and Yuthas, 2011). For SIE's management, this lack of transparency raises critical challenges. Failing to ensure ethical sourcing could lead to public backlash, especially in light of cases like the Congolese government's lawsuit against Apple (Ross, 2024). On the other hand, strengthening oversight mechanisms, such as increasing auditing measures, could incur higher costs without guaranteeing results, given the modularity of electronic GVCs. Managers are left navigating a precarious balance between maintaining ethical commitments and controlling operational expenses, risking accusations of 'greenwashing' if efforts are perceived as superficial.

Recommendations

The exploration of the PlayStation 5 supply chain highlights the systemic challenge posed by the oligopolistic nature of the semiconductor fabrication industry. With fabs concentrated in Asia and significant costs associated with establishing new production facilities, Sony Interactive Entertainment (SIE) remains vulnerable to the ubiquity of global chip shortages. This report proposes that SIE gradually invests in cloud gaming infrastructure — gaming using an internet service, as opposed to using hardware (Mariano and Koo, 2015, p. 969) — as a long-term strategy to mitigate these risks, and further their profitability interests. By reducing dependency on physical consoles, SIE can lower its reliance on contact manufacturers such as TSMC. Simultaneously, cloud gaming would also reduce operational costs associated with console production, offsetting the need for 'conflict minerals' and thus, improving ethical compliance.

Although cloud gaming is still in its infancy, requiring significant research and infrastructure development (Mariano and Koo, 2015; Harle et al., 2024), it holds transformative potential for the electronics industry. Initially, the shift would not resolve the chip shortage but would create long-term resilience by decreasing demand for consoles and shifting production priorities to technologies like TVs and computers. This transition would also reduce orders for suppliers like Foxconn, AMD, and TSMC, requiring SIE to manage stakeholder relations carefully during this shift. As consumer adoption grows and advancements in network infrastructure improve, SIE could solidify its leadership in a new era of electronics, gaming and hardware manufacturing.

However, this transition poses significant implications for other stakeholders within the supply chain. Contract manufacturers such as Foxconn, AMD, and TSMC would experience a decline in demand — minimal in the short term — as fewer consoles would be produced. For TSMC and AMD, whose revenues relies on custom chip orders, this would represent a substantial and incremental financial loss. Similarly, Foxconn's reliance on cheap labour for console assembly could create minor disruptions, impacting employment opportunities in the Global South. Conversely, upstream actors involved in the extraction of conflict minerals could experience reduced exploitation pressures as demand for raw materials experiences reduced demand. While this recommendation offers long-term resilience for SIE, it illustrates the impact — whether favourable or adverse — it has for other actors in the chain.

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Appendices

Appendix A

Sony PlayStation 5 Global Supply Chain Overview

The table below outlines a non-exhaustive Global Supply Chain (GSC) for the Sony PlayStation 5 (PS5), detailing upstream and downstream activities, geographic locations, and the roles of key actors involved.

Upstream	Activity	Geographical Location(s)	Key Actor(s) and Role
	Design and R&D	Japan	Sony Interactive Entrainment (SIE) defines goals, performance, and design specifications for the PS5.
		United States	Collaboration with AMD (Advanced Micro Devices), a <i>turn-key supplier</i> ¹ to create a custom APU (Accelerated Processing Unit) — AMD Zen 2 CPU and RDNA 2 GPU (Sony Interactive Entertainment, n.d.)
	Extraction of Raw Materials	Democratic Republic of Congo (DRC)	Extraction of minerals, namely tantalum, tin, gold, tungsten, cobalt (Sony Group Corporation, 2021).
		Australia	Extraction of lithium (Hawser, 2024).
		Taiwan	AMD outsource the manufacturing of microchips to TSMC —Taiwan Semiconductor Manufacturing Co. (Hill, 2024).
	Manufacturing	China	Foxconn assembles the majority of PS5 consoles (Chan, Pun, Selden, 2020; Starkey, 2024).
		Japan	Some PS5 consoles are assembled in Japan (Starkey, 2024).
	Distribution & Delivery		Sony has DADC (Digital Audio Disc Corporation) facilities that handle the distribution of PS5 consoles to retailers (Sony DADC, n.d.).
\mathbf{I}		North America, EMEA	SIE does distribute directly to consumers through its online store, PlayStation Direct.
Downstream	Consumption		As of October 2024, PS5 consoles are predominantly purchased in North America and Europe (VGChartz, 2024).

Notes: 1. In the context of the electronics GVC, a turn-key supplier uses its intellectual and production capacities to produce customised solutions for buyers (Sturgeon and Lee, 2001, pp. 8-9; Sturgeon, 2002, p. 455).