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Formula One on Track: Adaptive Supply Chains in High-Stakes Environments

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Abstract

The Formula One championship, with its succession of *Grands Prix*, provides a compelling case study of the interplay between sporting performance and global logistics, revealing an ecosystem in which even minor delays or disruptions in the supply chain can impact competition outcomes, safety, and the reputation of car manufacturers. Examining material flows and pre-positioning hubs underscores the operational complexity of a championship where air, sea, and road transport are carefully coordinated to ensure the timely availability and reliability of equipment across five continents. Logistics transcends mere material movement, functioning as a strategic lever for performance, resilience, and sustainability by integrating alternative fuels, multimodal transport, and real-time digital tracking technologies. The *Fédération Internationale de l'Automobile* (FIA) positions the supply chain as a central instrument for coordination, operational optimization, and carbon footprint reduction, reconciling continuity with environmental responsibility. By combining insights from sport, hospitality, and logistics, this article offers an original framework for understanding how high-intensity events manage tensions, uncertainties, and extreme operational constraints.

Keywords: Formula One, Global logistics, Hub, Motorsports, Supply chain, Sustainability, Transport management

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1. Introduction

In March 2025, as the Chinese *Grand Prix* in Shanghai approached, several leading Formula One teams, including McLaren, Red Bull, and Mercedes, experienced severe delays in the delivery of critical components, forcing temporary regulatory adjustments to curfew constraints in order to complete car preparation. Widely documented in specialist media, this disruption exposed the fragility of a globally distributed and highly time-sensitive supply chain in which marginal delays can cascade into sporting, safety, contractual, and reputational consequences. Formula One therefore constitutes an extreme illustration of global logistics vulnerability, where operational breakdowns propagate rapidly across tightly coupled systems. Beyond its sporting dimension, Formula One reflects a broader structural transformation associated with "*post-Westernization*" dynamics, characterized by a gradual rebalancing of economic and logistical centrality toward non-Western geographies (Bustad & Andrews, 2023). Under the strategic influence of *Liberty Media* (the American media and entertainment company that owns Formula One Group since 2017), the championship has progressively intensified its reliance on globally dispersed, interdependent logistics infrastructures. In such a configuration, material flow management extends beyond operational execution and becomes a strategic capability requiring anticipatory coordination, rapid decision-making, and continuous risk assessment. Within this analytical framing, Formula One emerges as a high-intensity laboratory for examining how organizations reconcile speed, reliability, and adaptability under extreme environmental pressure. Importantly, such conditions also amplify the relevance of organizational theory, particularly contingency theory, as structural configurations must continuously adjust to volatility, spatial dispersion, and temporal compression in order to maintain systemic coherence and performance stability.

Formula One *Grand Prix* events are embedded within the broader global events industry, characterized by the orchestration of unique, large-scale experiences requiring intensive mobilization of human, financial, and material resources (Ranjan, 2016). Each race depends on a highly integrated organizational architecture involving coordination across engineering teams, logistics providers, commercial partners, and regulatory bodies. Complexity increases further due to the economic significance of motorsport events, which generate substantial tourism inflows and regional development effects. Empirical evidence suggests that hosting a *Grand Prix* can increase tourist arrivals by approximately 6%, reinforcing strong governmental incentives to secure calendar inclusion (Ramasamy & Yeung, 2020). Beyond tourism, such events function as catalysts for investment, employment creation, and international visibility, particularly in emerging economies (Wanyonyi et al., 2021). However, the benefits are accompanied by structural constraints linked to financing, infrastructure readiness, and security management. In this context, competitive performance on track is inseparable from *logistical excellence off track*, positioning supply chain efficiency as a core determinant of event success. Formula One thus operates as a hybrid sport-industrial system in which operational precision directly translates into economic value creation and stakeholder legitimacy across a globally distributed ecosystem, reinforcing the idea that value is co-produced through sporting execution and backstage logistical coordination mechanisms.

At the intersection of operational excellence and environmental responsibility, Formula One provides a particularly revealing setting for examining how complex logistics systems are coordinated under conditions of uncertainty, temporal compression, and global dispersion. Using the *Fédération Internationale de l'Automobile* (FIA) as the empirical context, this study investigates the role of hub infrastructures, digital coordination systems, and collaborative logistics practices in supporting both logistical performance and sustainability objectives. Beyond its economic and operational dimensions, Formula One is deeply embedded within political and symbolic structures, where sport functions as an instrument of soft power, visibility, and strategic negotiation between public and private actors (Kaiser, 2021). Increasingly, this geopolitical dimension intersects with environmental imperatives as sustainability becomes a central governance priority. In response, the FIA has progressively integrated the United Nations Sustainable Development Goals into its operational framework, emphasizing renewable energy adoption, waste reduction, water management, and alternative fuel deployment (Kanza & Trisnaningtyas, 2025). Consequently, Formula One logistics is undergoing a structural transformation in which traditional imperatives of speed, reliability, and operational efficiency must be reconciled with environmental responsibility and carbon reduction objectives. The championship therefore operates at the intersection of multiple, often competing, imperatives, including global expansion, commercial profitability, regulatory compliance, and ecological transition. Within this context, logistics is no longer merely a support function but a strategic organizational capability that integrates performance optimization, sustainability governance, and reputational management within a unified operational logic. More broadly, such developments raise fundamental questions regarding how globally distributed logistics systems can simultaneously maintain high levels of responsiveness while accommodating increasingly demanding sustainability requirements.

Reconciling operational responsiveness with environmental responsibility has consequently emerged as a central challenge for contemporary logistics networks. From a theoretical perspective, the coexistence of these objectives calls for closer examination of the organizational mechanisms through which firms coordinate complex supply chain activities under conditions of uncertainty, interdependence, and environmental constraint. The FIA provides a particularly valuable setting for exploring these dynamics because its logistics system combines extreme temporal pressures, global geographical dispersion, and growing sustainability commitments within a single operational environment. In doing so, the study contributes to ongoing debates on supply chain resilience, network coordination, and sustainability-oriented logistics by illustrating how operational efficiency and environmental objectives can be jointly embedded within integrated logistics architectures. The paper is organized as follows. Section 2 establishes the theoretical and contextual foundations of Formula One logistics, with particular emphasis on its industrial evolution and progressive global expansion into a fully integrated high-performance logistics system. Section 3 details the methodological design, including data sources, research strategy, and analytical procedures, with particular attention to triangulation, robustness, and analytical transparency. Section 4 presents empirical evidence on hub-based logistics architectures (Findings #1), while Section 5 extends the analysis by examining sustainability-oriented strategies and their underlying mechanisms, highlighting the alignment between environmental uncertainty and organizational adaptation processes (Findings #2). Finally, Section 6 discusses the theoretical contributions and managerial implications of the findings for the governance of global supply chains operating in high-velocity and sustainability-constrained environments.

2. Conceptual Framework

Formula One ranks among the most high-profile and technologically sophisticated sports worldwide, integrating elite competition, industrial innovation, and precision logistics. Since its official inaugural season in 1950 (for an authoritative history of Formula One, see Hamilton [2026]), the championship has evolved into a global enterprise, simultaneously engaging industrial partners, technical staff, media organizations, and institutional bodies on an international scale. A contemporary season typically comprises between 20 and 24 *Grands Prix* spanning five continents, generating substantial travel and imposing considerable logistical demands on teams and their equipment. Each team must “orchestrate” the coordinated transport of single-seater vehicles, engines, gearboxes, spare parts, tires, fuel, mobile technical structures, and media infrastructure, all within extremely tight deadlines while adhering to a diverse set of regulatory constraints. Operational success relies on meticulous planning of material flows, supported by digital tracking, geolocation, and coordination tools, thereby minimizing the risk of delays or service disruptions. The scale and complexity of these operations reveal that Formula One extends beyond a purely sporting framework, resembling an integrated global supply chain in which each *Grand Prix* constitutes a temporary industrial operation requiring synchronized execution across multiple actors. Positioning Formula One as a hybrid industrial–sport system highlights how logistics performance directly shapes competitive outcomes, operational continuity, and organizational reliability under extreme temporal constraints.

From a theoretical perspective, Formula One can be examined through the contingency perspective which assumes that organizational effectiveness depends on the alignment between organizational arrangements and the characteristics of the environment. In highly dynamic and uncertain contexts, performance is associated with the capacity to adapt structures, processes, and coordination mechanisms to changing situational demands rather than relying on universally applicable practices. Environmental complexity, geographical dispersion, and operational uncertainty increase the need for flexible organizational configurations and enhanced integration across actors and resources (Miles & Snow, 2003 [1978]; Drazin & Van de Ven, 1985). This perspective is particularly relevant for logistics and supply chain management, where the effectiveness of operational practices depends on contextual conditions and the ability to maintain coherence between resources, information flows, and environmental constraints (Sousa & Voss, 2008). Furthermore, the growing interdependence among organizations reinforces the importance of coordination and integration mechanisms to sustain performance under uncertainty (Flynn et al., 2010). Within Formula One, logistics performance therefore emerges from the continuous adjustment of transport networks, inventory deployment, information-sharing systems, and coordination practices to evolving geographical, regulatory, temporal, and operational contingencies (Miller, 1987).

2.1. Global Expansion

Formula One traces its origins to early 20th-century European motor racing, particularly the *Grands Prix* held in France, Italy, and Germany (Jenkins, 2010). Following WWII, the FIA unified these events under a common regulatory framework, establishing the Formula One championship in 1946 and defining technical regulations for single-seater vehicles. The first official season, held in 1950, was limited to a few European races conducted on historic circuits such as Silverstone and Monza (Shields & Reavis, 2020). From the 1960s onward, sporting and media success fueled rapid internationalization, expanding the calendar beyond Europe and transforming the championship into a global spectacle that attracted sponsors, international media, and a growing audience (Herold et al., 2022). Formula One has thus developed into a global industrial and sporting complex where economic, cultural, and technological interactions extend far beyond Europe, particularly into North America and Asia, shaping both its structure and operational logic (Capparelli, 2016). Figure 1 illustrates the 2026 season spanning March to December. Each event requires rapid deployment of temporary infrastructure, technical paddocks, and audiovisual systems, while consecutive races in geographically distant locations, such as Baku and Singapore, approximately 7,400 miles apart, require precise logistical synchronization (Wieczorek, 2019). Such geographical dispersion converts Formula One into a continuously operating global logistics network characterized by high-frequency relocation, compressed preparation windows, and intensified cross-border coordination demands.

The internationalization of the Formula One championship has then substantially increased logistical complexity, particularly for flyaway races outside Europe, where air transport remains essential for delivering critical components (https://www.grandprix247.com/formula-1-news/how-formula-1-cars-travel-the-world-the-high-speed-logistics-behind-the-sport-in-2025, Accessed December 29, 2025). European circuits rely instead on road convoys transporting cars, garages, spare parts, and media equipment, requiring immediate dismantling and repacking after each *Grand Prix*. These flows must be coordinated with international carriers to ensure strict adherence to schedules despite customs constraints, time zone differences, and environmental variability. As highlighted by Orr et al. (2026), increasing exposure to climate-related disruptions such as extreme heat, flooding, and heavy rainfall further complicates logistics planning and reinforces uncertainty in operational execution. The 5Rs framework (Right resource, Right quantity, Right time, Right place, Right cost) illustrates the operational discipline required to maintain efficiency under such conditions (Wieczorek, 2019). This operational mastery positions the championship among the most efficient sports supply chains globally, where speed, precision, and reliability directly affect both sporting performance and overall season execution (Herold et al., 2022). Consequently, the logistics of the Formula One championship serve as a critical strategic lever, indispensable for teams and for sustaining a global sporting spectacle, a phenomenon that, as Debord (2024 [1967]) might suggest, transforms competition into a mediated display in which technical, economic, and visual dimensions converge to captivate a worldwide audience.

Figure 1. 2026 Formula One *Grand Prix* Season

Source: FIA (2026).

2.2. Flow Architecture

The logistics of the Formula One championship integrate air, sea, and road transport in a tightly coordinated system designed to meet extremely strict temporal and technical requirements (Herold et al., 2020). Critical components such as engines, gearboxes, and electronic systems are primarily transported by air to ensure rapid availability at each circuit, while large volumes of non-urgent material, including temporary infrastructure and spare parts, are shipped by sea to strategic hubs. Road transport then connects hubs to the circuits and supports intra-site movements, sometimes within highly constrained environments such as Monaco, where port areas function as temporary logistics bases (https://gpdestinations.com/monaco-grand-prix-f1-logistics/, Accessed May 26, 2026). Rotations to distant locations such as Australia require advanced planning and precise synchronization, illustrating the complexity of a system in which even minor disruptions can affect technical preparation and competitive performance (Wieczorek, 2019). The repetitive yet highly sensitive nature of these operations transforms each *Grand Prix* into a large-scale logistical project requiring anticipation, flexibility, and coordination among multiple actors. Logistical complexity is further amplified by the global ownership and media-driven structure of Formula One under *Liberty Media*, which increases the strategic importance of supply chain reliability as a component of both sporting and commercial performance (Evens et al., 2023).

Management of material flows relies on precise coordination between hubs and temporary infrastructure deployed at circuits, where each logistical stage is aligned with the tightly compressed seasonal calendar, as illustrated in Figure 2. Anticipation plays a central role in this process, as Europe-, United States-, and Middle East-based hubs enable pre-positioning of components and consolidation of flows across multiple races, thereby reducing reliance on emergency air transport and improving truck utilization for road segments (Herold et al., 2022). Container modularity combined with RFID and GPS tracking technologies ensures full traceability and allows real-time adjustments in response to operational disruptions. Coordination of inventory also follows a partial resource-sharing logic among teams and suppliers, reducing redundancy and increasing system-wide efficiency (Chakrabarty & Premkumar, 2023). Planning tools increasingly include centralized digital platforms capable of simulating alternative transport configurations and assessing risk exposure across different scenarios. Within this framework, each *Grand Prix* becomes part of a continuous logistics cycle in which precision, synchronization, and adaptability directly influence both operational continuity and competitive outcomes. This system design reflects a shift from linear logistics planning toward network-based and digitally coordinated supply chain ecosystems capable of dynamically reallocating resources under uncertainty.

Figure 2. Logistical Hurdles Across the 2024 Formula One *Grand Prix* Season

Source: https://huddleup.substack.com/p/the-incredible-logistics-of-formula-fc9
(Accessed May 14, 2026)

2.3. Network Coordination

Each *Grand Prix* mobilizes a complex assemblage of single-seater cars, spare parts, mobile garages, and temporary infrastructures required for spectators, media operations, and event delivery. The ten competing teams, each fielding two drivers, typically require approximately ten engines, fifteen gearboxes, and several hundred individual components per race (Wieczorek, 2019). The provision of these critical resources depends on specialized logistics providers capable of coordinating air, maritime, and ground transportation within highly compressed schedules and evolving geopolitical conditions (Pott et al., 2024). Air freight enables the rapid movement of time-sensitive components, whereas maritime transport supports the advanced deployment of heavier equipment to strategically located hubs, particularly across Europe and Asia (Herold et al., 2022). Operational success hinges on exceptional precision and synchronization, supported by RFID systems and GPS-enabled platforms that provide real-time visibility and facilitate rapid responses to disruptions. Consequently, each *Grand Prix* functions as a microcosm of a global supply network in which speed, reliability, and responsiveness jointly shape competitive performance and commercial value creation. Beyond operational considerations, logistics arrangements are intertwined with financial imperatives, regulatory governance, and geopolitical interests, influencing investment decisions, partnership configurations, and the geographic distribution of logistics hubs throughout the Formula One ecosystem (Næss, 2019). These interdependencies position Formula One as a multi-actor logistics ecosystem in which performance is co-created through the coordinated alignment of teams, suppliers, logistics providers, and governing bodies operating under extreme temporal constraints. Such configuration aligns with the contingency perspective, which emphasizes the need for greater integration across organizational actors and resources in highly uncertain and interdependent environments.

Since 2004, DHL Global Forwarding has played a central role, managing the transport of equipment to circuits often two weeks before each event to enable the full installation of garages, pit boxes, media facilities, and temporary infrastructure (https://www.grandprix247.com/formula-1-news/how-formula-1-cars-travel-the-world-the-high-speed-logistics-behind-the-sport-in-2025, Accessed April 16, 2026). Planning integrates physical, temporal, regulatory, and security dimensions, where even minor delays can disrupt testing or competitive preparation (Shields & Reavis, 2020). Teams anticipate parts requirements, adjust rotations between hubs and circuits, and modify flows in real time in response to weather disruptions, flight delays, or customs restrictions (Chakrabarty & Premkumar, 2023). The deployment of advanced digital systems ensures continuous tracking and enhances responsiveness across the entire supply chain. Coordination of human resources, inventory management, and local constraints transforms logistics into a strategic lever that supports both sporting performance and operational continuity. Sophisticated planning guarantees seasonal stability at a global scale, demonstrating the central role of logistics in sustaining Formula One as a high-performance industrial system. Within such framework, logistics evolves from a support function into a strategic coordination mechanism that integrates actors, technologies, and infrastructures into a unified operational network.

In addition to DHL Global Forwarding, specialized logistics service providers such as CEVA Logistics (supporting Scuderia Ferrari) and DP World (supporting McLaren Racing) contribute expertise drawn from commercial supply chains, adapted to the extreme demands of the championship. These providers implement advanced planning, demand forecasting, and inventory management strategies, utilizing hubs to consolidate, pre-position, and redistribute critical components and consumables in a manner comparable to humanitarian logistics systems (Roh et al., 2015). Hubs also enable partial pooling of flows between teams, reducing costs and optimizing transport resources. Rotations are designed to anticipate disruptions and mitigate risks associated with delays, weather variability, and customs constraints. By combining air transport for critical components, sea transport for non-urgent volumes, and road transport for local distribution, alongside digital technologies such as GPS, RFID, and real-time tracking platforms, teams can continuously adjust logistical priorities. Experience gained in this highly constrained environment illustrates how industrial supply chain practices are refined and transferred across sectors, enhancing responsiveness and operational efficiency. Logistics thus emerges as a strategic pillar in which sporting performance, safety, and cost control depend on precise coordination of global material flows. The convergence of commercial logistics expertise and motorsport-specific constraints illustrates the emergence of hybrid supply chain models that blend industrial efficiency with extreme operational adaptability.

3. Methodology

This study adopts a qualitative single-case research design focusing on Formula One as a critical and information-rich setting for examining global logistics management under conditions of high operational volatility, temporal compression, and spatial dispersion. The methodological strategy is driven by theory-building objectives rather than statistical generalization, making the case particularly suitable for investigating how high-velocity logistics systems adapt to structurally constrained and globally distributed environments. Data collection relies exclusively on secondary documentary sources, ensuring analytical breadth while maintaining feasibility given the proprietary and geographically dispersed nature of Formula One logistics operations. The analytical perspective is explicitly interpretive and system-oriented (Stake, 2005; Yin, 2018), focusing on interactions between logistics hubs, transport modalities, digital coordination infrastructures, and governance mechanisms. Rather than privileging actor-level accounts, the approach seeks to identify recurrent organizational logics underpinning logistics performance under extreme conditions. Overall, the design emphasizes conceptual rigor, transparency, and internal coherence, in line with established qualitative case study methodologies in operations and supply chain research.

Data were collected through a structured document review process using Google Scholar as the primary academic database, complemented by institutional reports and industry publications. To ensure reproducibility, a predefined set of keywords was systematically applied during searches: "*Formula One logistics*," "*global motorsport logistics*," "*high-velocity supply chains*," "*sports mega-event logistics*," "*multimodal transport coordination*," and "*sustainable logistics decarbonization*." These keywords were used in multiple combinations and refined iteratively to capture both operational and sustainability dimensions of Formula One logistics systems. The search strategy prioritized peer-reviewed journal articles, conference papers, FIA official publications, and logistics provider reports (e.g., DHL, CEVA, DP World), alongside selected high-quality industry analyses. Temporal filtering was applied to prioritize publications from 2005 onward, reflecting the modern globalization phase of Formula One logistics. Sources were screened for conceptual relevance to logistics coordination, hub architecture, multimodal transport systems, and sustainability transitions. Documents that did not explicitly address operational logistics mechanisms or environmental implications in global supply chains were excluded at the first screening stage. This structured protocol ensured consistency, traceability, and analytical rigor across the dataset.

Source selection followed a multi-stage inclusion and exclusion protocol designed to ensure analytical robustness and conceptual coherence. Inclusion criteria required that documents explicitly address at least one of the following dimensions: global logistics coordination in high-performance environments, multimodal transport integration, hub-based distribution systems, digital tracking technologies (e.g., RFID, GPS), or sustainability transitions in transport-intensive industries. Only English-language sources were retained to ensure terminological consistency across the analytical corpus. Peer-reviewed academic articles were prioritized, followed by official FIA documentation and reports from recognized logistics providers, while non-scholarly media sources were included only when they provided operational insights unavailable in academic literature. Exclusion criteria eliminated sources lacking methodological transparency, purely descriptive content without analytical depth, and publications not directly linked to logistics operations or supply chain management. To enhance reliability, triangulation was applied across three levels: academic literature, institutional documentation, and industry reporting. This multi-source validation strategy ensured convergence of evidence and reduced interpretive bias.

4. Findings #1—Networked Hub Coordination

The logistics of the Formula One championship face an unprecedented challenge: ensuring the delivery of critical components with extreme precision across a global calendar spanning five continents. To address this, the FIA has adopted a model of pre-positioning hubs, owned and operated by logistics service providers, which centralize storage and supply. These hubs act as command centers, orchestrating the simultaneous delivery of engines, gearboxes, suspensions, electronic systems, and consumables to multiple circuits worldwide. Centralization creates a strategic dilemma: reconciling speed, reliability, cost, and sustainability in an environment where even minor delays can compromise both sporting performance and the teams' reputations. Hubs enable anticipation of calendar fluctuations—for instance, by supplying European *Grands Prix* from a site in Germany—while pooling resources across multiple teams to generate economies of scale and optimize container and truck utilization. This approach reflects the integration of global industrial logistical practices into Formula One, combining operational performance, resilience, and environmental sustainability, and illustrating the ability of teams to transform complex logistical challenges into tangible competitive advantages. The hub-based architecture reflects a structural shift toward networked logistics governance in which spatial concentration and temporal anticipation are used as primary levers of performance optimization.

4.1. Locating Hubs for Maximum Impact

Hub locations are determined through an analysis of geographical, operational, and industrial factors. Sites are selected for their proximity to circuits, access to international ports and airports, and capacity to store and secure large volumes of sensitive equipment. European hubs, particularly in Germany and the Netherlands, supply multiple *Grands Prix* from centralized bases, reducing reliance on express air freight. In the United States and the Middle East, hubs cover extensive distances and anticipate the specific requirements of races such as Austin, Las Vegas, Miami, and Jeddah, where deadlines and technical demands necessitate meticulous planning. Centralization facilitates resource sharing between teams, reducing costs and optimizing rotation schedules. At the same time, concentration of assets in a limited number of hubs increases exposure to localized disruptions such as extreme weather or operational failures. Resilience therefore depends on redundancy mechanisms, contingency planning, and coordination with logistics partners and authorities (Chamberlain et al., 2019). Hub location decisions thus operate as strategic trade-offs between efficiency gains and systemic vulnerability. Such trade-offs highlight that hub geography is not merely an operational choice but a strategic configuration mechanism shaping the resilience and adaptability of the entire Formula One logistics system.

Hubs also optimize flows and reduce lead times. By pre-positioning critical parts, engines, gearboxes, and electronic systems while stockpiling less urgent components, they allow rapid adjustments to unforeseen events such as last-minute schedule changes or local operational constraints (Gezici & Er, 2014). Security and monitoring systems ensure continuous protection of assets and operational continuity. Lefebvre & Roult (2011) emphasize the importance of aligning hub locations with "*dominant emerging cities*," where economic and media growth enhances logistical efficiency. Centralization also enables prioritization of less carbon-intensive transport modes for secondary flows while maintaining speed for critical components. The integration of GPS, RFID, and real-time tracking systems provides full visibility over inventory and rotations, improving responsiveness and coordination. Hub management therefore demonstrates how logistical efficiency, competitive performance, and operational resilience are interdependent in a global championship environment. The resulting configuration reflects a hybrid logistics model that combines spatial centralization, digital visibility, and multimodal transport optimization to manage uncertainty at scale.

4.2. Optimizing Hub Operations and Benefits

Hubs function as dynamic coordination platforms where flow planning relies on demand forecasting, risk assessment, and continuous collaboration with teams, suppliers, and logistics service providers. Critical components such as engines, gearboxes, and electronic systems are pre-positioned according to anticipated race requirements, while secondary materials are stored and redistributed based on priority rules (Mourão, 2017). This structure reduces reliance on express air freight and improves intercontinental rotation efficiency, while strengthening resilience against calendar disruptions, geopolitical shocks, and environmental variability. Advanced digital technologies and tracking systems provide real-time visibility over inventory and shipments, enabling immediate operational adjustments. Modular container systems and flexible reconfiguration capabilities ensure uninterrupted availability of critical parts, directly supporting sporting performance and operational continuity. The operational model transforms hubs into adaptive logistics control systems capable of dynamically reallocating resources in response to fluctuating global race demands. Hub-based architecture further embeds anticipatory coordination mechanisms that enhance cross-team synchronization, mitigate cascading delays across interconnected transport layers, and reinforce strategic redundancy in high-pressure operational environments, thereby elevating hubs from passive storage facilities to active decision-support nodes in a globally distributed logistics network.

Consolidating shipments through hubs also generates significant sustainability and cost advantages. Pooling flows across multiple teams reduces the number of dedicated flights, maximizes container utilization, and increases reliance on maritime and road transport modes (Petralia & Tebaldi, 2025). The concept of "*platforming*," as defined by Paché (2020), enables rerouting of critical components between circuits without returning to original depots, significantly increasing flexibility. Automation of logistics processes and end-to-end traceability enhance monitoring capacity and improve responsiveness to disruptions, as illustrated in industry reports on Formula One logistics operations (https://www.freightwaves.com/news/the-extreme-logistics-behind-formula-ones-global-circus, Accessed June 13, 2026). As summarized in Table 1, the strategic function of hubs extends beyond physical consolidation to encompass digital integration, risk mitigation, and supply chain resilience. Lefebvre & Roult (2011) underline that adapting hub locations to the needs of circuits strengthens operational efficiency and responsiveness. By combining strategic planning, inter-team collaboration, and digital technologies, hubs become a central lever for reconciling sporting performance, operational continuity, and economic efficiency, demonstrating the pivotal role of logistics in a global championship where every minute and every component counts. Such evolution positions hubs as strategic nodes within a global logistics ecosystem where physical infrastructure and digital coordination systems operate in tight integration.

Table 1. Strategic Functions and Impacts of Hubs in Formula One

Dimensions	Role of hubs	Key mechanisms	Strategic impacts
Strategic location	Enable multi-continental coverage from a limited number of platforms	Proximity to circuits, ports, and international airports	Shorter lead times and increased delivery reliability
Operational coordination	Synchronize inbound, storage, and outbound flows across race events	Demand forecasting, pre-positioning, modular containerization	Continuity of operations and reduced disruption risk
Digital integration	Provide real-time visibility and control of assets and flows	RFID, GPS tracking, integrated logistical platforms	Faster decision-making and enhanced responsiveness
Cost and sustainability optimization	Consolidate shipments and reduce reliance on express air freight	Multimodal transport, load consolidation, shared infrastructure	Lower logistical costs and reduced carbon footprint
Supply chain resilience	Absorb shocks arising from calendar changes or local disruptions	Redundancy, contingency planning, network flexibility	Improved robustness and competitive stability

Source: The Author.

5. Findings #2—Decarbonization of Global Flows

The global logistics of Formula One, responsible for delivering single-seater vehicles, spare parts, mobile garages, and temporary infrastructure to all corners of the globe, represents a major environmental challenge and contributes significantly to the championship's carbon footprint. Beyond the travel of team personnel (50 to 80 individuals per team) and fans (up to 400,000 spectators over a weekend), freight movements weigh heavily on emissions, prompting the FIA to implement an ambitious carbon-neutrality strategy by 2030. A set of integrated approaches underpins the strategy, including the adoption of alternative fuels, multimodal transport planning, optimization of equipment rotations, and improvements in energy efficiency across operations. These initiatives reflect a persistent tension between operational performance and environmental responsibility, namely the challenge of reconciling a demanding global calendar requiring fast and reliable deliveries with the imperative of reducing ecological impact. Integrating cleaner fuels into ground transport and optimizing routing illustrate how sustainability and logistical efficiency have become complementary rather than opposing objectives. This proactive vision positions logistics as a key element of success for the Formula One season, where every operational decision—from component delivery to choice of transport mode—must reconcile continuity, competitiveness, and environmental responsibility, offering a structured model of responsible supply chain management for other sectors facing significant carbon footprints.

5.1. Integrating Sustainable Fuels and Transport

To mitigate environmental impact, the FIA deploys an integrated strategy combining alternative fuels, multimodal transport, and advanced flow optimization. Pilot programs employing sustainable aviation fuel (SAF) for chartered cargo flights demonstrate significant reductions in emissions per ton-kilometer compared with conventional fuels, reflecting a concrete and strong commitment to sustainability (https://www.formula1.com/en/latest/article/formula-1-expands-sustainable-aviation-fuel-investment-through-new-qatar.1C47JaQbIt1lB35vkg6AM1, Accessed July 6, 2025). This strategy is complemented by using bioenergy trucks for ground transport and route optimization, reducing reliance on highly polluting modes while maintaining responsiveness under extremely tight schedules (Chiles, 2025). Consolidation of flows within hubs in Europe, North America, and the MENA region enables prioritization of maritime rotations for non-critical components and limits express air freight to essential parts, ensuring immediate equipment availability without compromising environmental performance (Dębicki, 2008). Advanced digital tracking and planning systems provide real-time visibility into shipments, facilitating rapid adjustments while integrating the objectives of the FIA's "*Countdown to Zero*" plan for overall emission reduction (Sturm et al., 2025). This combination of technologies and transport modes illustrates how Formula One reconciles competitive performance, operational continuity, and environmental responsibility in a high-intensity global sport.

Beyond fuel choices and transport modes, technological innovation transforms supply chain management into a genuine driver of environmental performance. Multimodal planning maximizes truck and container utilization, minimizes express flights, and enables rapid redistribution of equipment from hubs to circuits, thereby optimizing the overall carbon footprint of operations (https://f1chronicle.com/the-logistics-and-effort-behind-each-f1-race/, Accessed March 11, 2026). Experimental sustainability initiatives, such as installing solar panels at circuits and employing green hydrogen for selected races, reinforce this strategic framework (Fekri, 2024). Flow analysis and coordination with international logistics partners ensure the availability of critical components while minimizing emissions. This structured approach demonstrates that sustainable logistics in Formula One is not a collection of isolated actions but a comprehensive strategy capable of serving as a model for other sectors with complex, carbon-intensive global supply chains (Öztopcu, 2024). By integrating planning, multimodality, and advanced technologies, the FIA demonstrates that operational performance and ecological responsibility can converge effectively.

5.2. Enhancing Flow Efficiency under Environmental Constraints

Managing the volume of goods required by the FIA presents a substantial challenge, given the simultaneous transportation of single-seater cars, engines, gearboxes, tires, technical structures, and media equipment across five continents according to extremely tight schedules (Dębicki, 2008). To reduce CO_2 emissions while maintaining operational performance, teams have adopted a sophisticated multimodal approach, combining maritime and local road transport for non-critical components, while essential parts continue to travel by air to ensure immediate availability at every circuit (Chiles, 2025). The integration of real-time digital tracking systems, automated inventory software, and operational data analytics enables route optimization, coordinated rotations, and anticipation of unforeseen requirements, providing full visibility of all equipment from hubs to the paddock (Öztopcu, 2024). This complex orchestration shows that Formula One logistics extends beyond simple equipment movement, functioning as a strategic lever that combines advanced technology, meticulous planning, and collaboration with international partners to reconcile operational continuity, efficient flows, and environmental responsibility, while reinforcing supply chain resilience and sustainability.

Operational planning must constantly account for the variability of the calendar and the specific characteristics of each *Grand Prix*, including circuit infrastructure and local traffic conditions. Races in the Middle East or Asia often require long-haul air freight despite its high carbon footprint (Fekri, 2024). To limit environmental impact, the FIA prioritizes maritime and road transport for non-critical components while reserving express air transport for essential items, ensuring immediate equipment availability (Dębicki, 2008). Integration of alternative fuels and bioenergy trucks further reduces emissions, while maintaining responsiveness under demanding schedules. Coordination with logistics service providers includes preventive maintenance, load optimization, and eco-driving practices, demonstrating continuous adaptation of organizational structures to operational constraints. These measures transform the supply chain into a strategic lever, reconciling operational performance, continuity, and environmental responsibility, exemplifying how a globalized, high-intensity sport can integrate sustainability while preserving competitiveness (https://www.formula1.com/en/latest/article/formula-1-expands-sustainable-aviation-fuel-investment-through-new-qatar.1C47JaQbIt1lB35vkg6AM1, Accessed April 16, 2026).

Finally, Formula One logistics illustrates the practical application of contingency theory in a highly internationalized, high-intensity operational environment. The flexibility and adaptability required to respond to each circuit's specific constraints and unforeseen calendar events reflect Lawrence & Lorsch's (1986 [1967]) central idea that organizational structures must align with environmental contingencies to remain effective. Coordination among multiple subsystems—logistics, transport, supply, and maintenance—demonstrates Galbraith's (1973) emphasis on cross-functional communication and process synchronization, reducing bottlenecks and strengthening operational continuity. Moreover, alignment between sporting performance, sustainability objectives, and supply chain resilience embodies Donaldson's (2001) principle that coherence between structure and purpose maximizes organizational effectiveness. The interplay among strategic priorities, operational mechanisms, environmental goals, and outcomes, summarized in Table 2, reflects the structuring of integrated sustainable logistics. This integration is realized through detailed financial and operational analyses, centralization of equipment in hubs, and experimentation with sustainable solutions such as solar panels and green hydrogen. Collectively, such practices illustrate how the FIA has transformed logistics into a strategic lever, balancing operational performance, environmental responsibility, and adaptive capacity in a complex global context.

Table 2. Integrated Dimensions of Sustainable Logistics in Formula One

Analytical Levers	Core Mechanisms	Environmental Objectives	Operational Outcomes
Transport energy transition	Adoption of SAF; biofuel trucking; hydrogen pilots	Reduction of freight carbon intensity	Preservation of delivery reliability
Multimodal flow configuration	Modal prioritization; air–sea–road differentiation	Emissions minimization through modal shift	Cost and time efficiency
Hub-based consolidation	Pre-positioning; shipment pooling; regional buffering	Limitation of express transport	Improved responsiveness and resilience
Digital flow orchestration	RFID tracking; GPS monitoring; real-time analytics	Waste and idle-movement reduction	Enhanced visibility and coordination
Strategic alignment	Integration of sustainability into planning	Long-term decarbonization pathway	Organizational coherence

Source: The Author.

6. Discussion and Conclusion

This article examined the research question: *how does the FIA, through its hubs, digital systems, and collaborative practices, manage critical material flows within a complex, volatile, and uncertain global environment?* The findings #1 and #2 provide a coherent response to this research question by showing that global logistics performance in Formula One relies on the structural integration of hub-based architectures, multimodal transport coordination, and digitally enabled real-time visibility systems, collectively transforming uncertainty into operationally manageable variability. The logistics system underpinning the Formula One championship extends far beyond the mere transport of single-seaters and spare parts, constituting instead a highly orchestrated strategic supply chain in which flexibility, anticipation, and technological coordination are tightly interdependent. Hub deployment, combined with multimodal transport configurations and advanced digital infrastructures, ensures the timely availability of critical components under extremely compressed temporal constraints, while simultaneously enabling cost containment and carbon reduction. The adoption of alternative fuels and the optimization of global rotations further illustrate how operational efficiency and environmental responsibility are increasingly co-constructed objectives within the FIA logistics model. Empirical illustrations, including Europe–Asia routing strategies, the use of HVO100-powered trucks, and RFID-enabled container tracking, demonstrate that each logistical decision reflects a continuous trade-off between competitiveness, reliability, safety, and sustainability. Overall, the analysis confirms that Formula One logistics operates as a strategic capability in which performance outcomes, organizational resilience, and environmental impact are structurally intertwined rather than separately managed dimensions.

From a theoretical standpoint, the findings extend the contingency perspective by demonstrating that organizational adaptation in highly volatile logistics environments is not limited to reactive alignment with external conditions. Contingency theory posits that organizational effectiveness depends on achieving an appropriate fit between structural arrangements and environmental characteristics. The Formula One case suggests a more proactive dynamic in which organizations deliberately design and continuously reconfigure logistics architectures to reduce the operational consequences of uncertainty. Hub infrastructures, digital visibility systems, and collaborative coordination mechanisms do not merely respond to environmental complexity; they actively transform it into a more predictable and manageable set of operational conditions. In this sense, the findings support the view that organizational fit is achieved through the development of adaptive capabilities that continuously mediate the relationship between environmental volatility and performance outcomes. Moreover, the findings underline that contingency alignment increasingly encompasses sustainability objectives alongside traditional efficiency and reliability concerns. The ability to simultaneously coordinate speed, resilience, and environmental performance suggests that contemporary logistics systems must achieve multidimensional forms of fit, extending contingency theory beyond its traditional focus on operational effectiveness alone.

The managerial implications are significant for supply chain executives operating in environments characterized by high uncertainty, time pressure, and global dispersion. The application of contingency theory to Formula One logistics highlights that structural adaptability constitutes a central mechanism for reconciling operational efficiency with sustainability imperatives. Effective coordination requires continuous alignment across material flows, transport constraints, digital capabilities, and environmental targets, supported by proactive risk anticipation and systematic optimization of routing and inventory strategies. Practices such as partial resource pooling, anticipatory positioning, and close integration with specialized logistics providers further illustrate the importance of inter-organizational coordination and information sharing in achieving system-level performance. The strategic role of hubs, combined with multimodal transport orchestration, demonstrates how organizations can simultaneously enhance resilience, reduce operational costs, and lower carbon intensity without compromising service reliability. These insights extend beyond motorsport and offer a transferable analytical framework for industries facing similar constraints, including aerospace, pharmaceuticals, and large-scale international event management. Formula One thus provides a paradigmatic case of how digitally enabled and geographically distributed supply chains can convert structural tensions between speed, reliability, and sustainability into a source of durable competitive advantage.

Inter-organizational performance in such systems is also influenced by how actors respond when business relationships deteriorate under conditions of operational pressure and uncertainty. Vidal et al. (2016) demonstrate that the outcomes of relationship degradation depend on *behavioral responses* structured around exit, voice, loyalty, and neglect. These responses are contingent on both the nature of the relationship and the level of commitment at the onset of disruption, thereby shaping whether coordination stabilizes, recovers, or further deteriorates over time. In highly interdependent logistics ecosystems such as Formula One, this suggests that system performance is not solely determined by structural integration, but also by the differentiated behavioral reactions of actors when relational tensions emerge, particularly under time-sensitive constraints where coordination breakdowns may propagate rapidly across interconnected actors and transport layers, amplifying systemic vulnerability and requiring adaptive governance mechanisms. Such dynamics underscore the importance of relational sensitivity, trust calibration, and anticipatory communication protocols within distributed supply chain networks operating under extreme volatility.

Beyond supply chain management, this study contributes to tourism, hospitality, and sport scholarship by highlighting the central role of logistics in the production and success of global mega-events. Formula One

Grand Prix events function as complex tourism ecosystems whose performance depends not only on sporting spectacle but also on the reliability and precision of backstage operational systems. The ability to deploy temporary infrastructure, paddock facilities, hospitality zones, and media installations within highly constrained timeframes directly shapes stakeholder experience, destination image, and long-term attractiveness of host regions. In this context, hub-based logistics and multimodal transport strategies act as critical enablers of destination readiness, allowing host economies to absorb recurring mega-events while mitigating disruptions and externalities associated with large-scale mobility flows. For hospitality stakeholders, the predictability of logistics operations supports demand forecasting, staffing strategies, and service quality management during periods of extreme intensity. Formula One therefore illustrates how logistics systems function as a foundational determinant of both event performance and tourism value creation, reinforcing the need to conceptualize mega-events as integrated socio-technical systems in which mobility, experience production, and sustainability are inseparable.

Building on these contributions, several avenues for future research emerge. First, quantitative studies could assess the performance effects of hub-based configurations, particularly in terms of cost efficiency, lead-time reduction, and emissions mitigation. Second, further research could explore the role of digital technologies, including artificial intelligence and predictive analytics, in enhancing real-time decision-making within highly volatile logistics environments. Third, comparative applications of contingency theory across different high-performance sectors could deepen understanding of how organizational flexibility shapes the balance between efficiency and sustainability. Fourth, the environmental dimension warrants further investigation, particularly regarding the scalability and effectiveness of alternative fuels, multimodal optimization strategies, and collaborative governance mechanisms among competing stakeholders. Collectively, these research directions point toward an integrated agenda in which performance, resilience, and sustainability are jointly theorized and empirically examined, extending far beyond the specific context of Formula One logistics systems.

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Conflict of Interest

The author declared that this work was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

References

Bustad, J., & Andrews, D. (2023). The circus comes to town: Formula 1, globalization, and the Uber-sport spectacle. In D. Sturm, S. Wagg, & D. Andrews (Eds.), *The history and politics of motor racing: Lives in the fast lane* (pp. 595–617). Cham: Palgrave Macmillan.

Capparelli, C. (2016). *The World Formula One championship and North America: The development of a globalized industrial sports complex?* Unpublished doctoral dissertation, University of London.

Chakrabarty, J.-B., & Premkumar, P. (2023). Understanding sports logistics: Scope, framework, and disruptions. In B. Basu, M. Desbordes, & S. Sarkar (Eds.), *Sports management in an uncertain environment* (pp. 59–75). Singapore: Springer.

Chiles, X. (2025). Formula 1's drive to environmental sustainability. *Seattle Journal of Technology, Environmental, & Innovation Law, 15*(2), Article 6. https://digitalcommons.law.seattleu.edu/sjteil/vol15/iss2/6

Chamberlain, D., Edwards, D., Lai, J., & Thwala, W.-D. (2019). Mega event management of Formula One *Grand Prix*: An analysis of literature. *Facilities, 37*(13–14), 1166–1184. https://doi.org/10.1108/F-07-2018-0085

Dębicki, T. (2008). Challenges for logistics in the pinnacle of motorsports–Formula 1. *Archives of Transport System Telematics, 1*(1), 3–7. https://bibliotekanauki.pl/articles/393974

Debord, G. (2024 [1967]). *The society of the spectacle*. Binghamton (NY): PM Press.

Donaldson, L. (2001). *The contingency theory of organizations*. Thousand Oaks (CA): Sage.

Drazin, R., & Van de Ven, A. (1985). Alternative forms of fit in contingency theory. *Administrative Science Quarterly*, *30*(4), 514–539. https://doi.org/10.2307/2392695

Evens, T., Tickell, S., & Næss, H.-E. (2023). Ecclestone out, *Liberty Media* in: A look into the shifting ownership structure of Formula One. In D. Sturm, S. Wagg, & D. Andrews (Eds.), *The history and politics of motor racing: Lives in the fast lane* (pp. 571–592). Cham: Palgrave Macmillan.

Fekri, F. (2024). Green hydrogen and Formula 1 (F1): Advancing sustainable comprehensive approaches for F1 events in the MENA region. *Journal of Sustainable Development Law & Policy, 15*(2), 114–140. https://doi.org/10.4314/jsdlp.v15i2.5

Flynn, B., Huo, B., & Zhao, X. (2010). The impact of supply chain integration on performance: A contingency and configuration approach. *Journal of Operations Management*, *28*(1), 58–71. https://doi.org/10.1016/j.jom.2009.06.001

Galbraith, J. (1973). *Designing complex organizations*. Boston (MA): Addison-Wesley.

Gezici, F., & Er, S. (2014). What has been left after hosting the Formula 1 *Grand Prix* in Istanbul? *Cities, 41*, 44–53. https://doi.org/10.1016/j.cities.2014.05.004

Hamilton, M. (2026). *Formula 1: The official history*. London: Welbeck Publishing.

Herold, D., Breitbarth, T., Schulenkorf, N., & Kummer, S. (2020). Sport logistics research: Reviewing and line marking of a new field. *The International Journal of Logistics Management, 31*(2), 357–379. https://doi.org/10.1108/IJLM-02-2019-0066

Herold, D., Joachim, G., Frawley, S., & Schulenkorf, N. (2022). *Managing global sport events: Logistics and coordination*. Leeds: Emerald Publishing.

Jenkins, M. (2010). Technological discontinuities and competitive advantage: A historical perspective on Formula 1 motor racing 1950–2006. *Journal of Management Studies, 47*(5), 884–910. https://doi.org/10.1111/j.1467-6486.2010.00928.x

Kaiser, B. (2021). *The strategic politics of Formula 1 racing: Insights from game theory and social choice*. Unpublished doctoral dissertation, University of California at Irvine.

Kanza, V.-D., & Trisnaningtyas, J.-P. (2025). Sustainability strategies of the *Fédération Internationale de l'Automobile*: Integrating the sustainable development goal into Formula 1. *Journal of Social Studies Arts & Humanities, 5*(2), 62–70. https://doi.org/10.33751/jssah.v5i2.12847

Lawrence, P., & Lorsch, J. (1986 [1967]). *Organization and environment: Managing differentiation and integration*. Boston (MA): Harvard Business School Press.

Lefebvre, S., & Roult, R. (2011). Formula One's new urban economies. *Cities, 28*(4), 330–339. https://doi.org/10.1016/j.cities.2011.03.005

Miles, R., & Snow, C. (2003 [1978]). *Organizational strategy, structure, and process*. Redwood City (CA): Stanford University Press.

Miller, D. (1987). The genesis of configuration. *Academy of Management Review*, *12*(4), 686–701. https://doi.org/10.5465/amr.1987.4306720

Mourão, P. (2017). *The economics of motorsports: The case of Formula One*. London: Palgrave Macmillan.

Næss, H.-E. (2019). Investment ethics and the global economy of sports: The Norwegian Oil Fund, Formula 1 and the 2014 Russian *Grand Prix*. *Journal of Business Ethics, 158*, 535–546. https://doi.org/10.1007/s10551-017-3751-8

Orr, M., Kellison, T., Ross, W., Trendafilova, S., Pelcher, J., Watanabe, N., Howell, J., & Rouhas, Z. (2026). Climate risks in motorsport: Setting boundary conditions in Formula 1. *European Sport Management Quarterly*, *26*(1), 23–44. https://doi.org/10.1080/16184742.2025.2503163

Öztopcu, A. (2024). Environmental sustainability in sport: Formula 1's SDGs responsiveness. *Environment, Development & Sustainability, 26*(12), 31075–31097. https://doi.org/10.1007/s10668-023-0424

Paché, G. (2020). Service innovation in historical perspective: the case of "platforming." *European Review of Service Economics & Management, 10*, 173–185. https://doi.org/10.15122/isbn.978-2-406-11028-6.p.0173

Petralia, M.-M., & Tebaldi, L. (2025). From road transport to intermodal freight: The Formula 1 races logistics case. *Sustainability, 17*(15), Article 6889. https://doi.org/10.3390/su17156889

Pott, C., Spiekermann, C., Breuer, C., & Ten Hompel, M. (2024). Managing logistics in sport: A comprehensive systematic literature review. *Management Review Quarterly, 74*, 2341–2400. https://doi.org/10.1007/s11301-023-00361-5

Ramasamy, B., & Yeung, M. (2020). Does Formula 1 *Grand Prix* attract tourists? *Tourism Analysis, 25*(4), 473–479. https://doi.org/10.3727/108354220X16020580167829

Ranjan, W. (2016). A review of sport events impact evaluation methods. *Journal of Tourism, Hospitality & Sports, 19*, 31–36. https://iiste.org/Journals/index.php/JTHS/article/view/31392

Roh, S., Pettit, S., Harris, I., & Beresford, A. (2015). The pre-positioning of warehouses at regional and local levels for a humanitarian relief organisation. *International Journal of Production Economics*, *170*, 616–628. https://doi.org/10.1016/j.ijpe.2015.01.015

Shields, B., & Reavis, C. (2020). *Formula 1: Unleashing the greatest racing spectacle on the planet* (Case No. 19–194). Cambridge (MA): MIT Management Sloan School.

Sousa, R., & Voss, C. (2008). Contingency research in operations management practices. *Journal of Operations Management*, *26*(6), 697–713. https://doi.org/10.1016/j.jom.2008.06.001

Stake, R. (2005). Qualitative case studies. In N. Denzin, & Y. Lincoln (Eds.), *The Sage handbook of qualitative research* (3rd ed., pp. 433–466). Thousand Oaks (CA): Sage.

Sturm, D., Andrews, D., Miller, T., & Bustad, J. (2025). Green light or black flag? Greenwashing environmental sustainability in Formula One and Formula E. *Annals of Leisure Research, 28*(1), 116–135. https://doi.org/10.1080/11745398.2024.2376754

Vidal, D., Fenneteau, H., & Paché, G. (2016). Should I stay or should I go? Customers' reactions faced with the deterioration of a business relationship. *Journal of Business & Industrial Marketing*, *31*(1), 47–58. https://doi.org/10.1108/JBIM-06-2014-0124

Wanyonyi, L., Njoroge, J., & Juma, R. (2021). Challenges and opportunities to sustainable sport tourism events: Insights from an urban host city. *Journal of Tourism, Hospitality & Sports, 55*, 40–55. https://doi.org/10.7176/JTHS/55-06

Wieczorek, A. (2019). Logistics in racing sports on the example of F1. *Transport Economics & Logistics, 82*, 143–150. https://doi.org/10.26881/etil.2019.82.12

Yin, R. (2018). *Case study research and applications: Design and methods* (6th ed.). Thousand Oaks (CA): Sage.