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Smart Procurement in the Sports Industry: A Strategic Approach for Efficiency and Performance Enhancement

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Abstract

The global sports industry, valued at over $600 billion, encompasses a vast network of procurement activities, ranging from player equipment and stadium operations to event logistics and merchandising. Traditional procurement in sports has been plagued by inefficiencies, including fragmented supplier networks, manual processes, and inconsistent pricing models. As the sports industry continues its digital transformation, smart procurement is no longer an option but a necessity. The integration of AI, blockchain, IoT, and sustainable sourcing practices is set to redefine sports procurement, ensuring greater efficiency, cost-effectiveness, and long-term resilience. This research examines the role of smart procurement technologies in revolutionizing procurement strategies for sports teams, stadiums, and major sporting events. AI-driven procurement platforms leverage machine learning models for supplier selection, demand forecasting, and automated contract negotiation. Empirical evidence demonstrates that smart procurement adoption in sports can reduce procurement cycle times by 40% (industry report), achieve cost savings of up to 20% (industry report), and improve overall supply chain resilience (industry report). Real-world case studies, such as PUMA's AI-driven merchandising optimization, Tokyo 2020's sustainable procurement framework, and Mercedes-Benz Stadium's IoT-powered beverage tracking, highlight the measurable impact of digital procurement strategies. Despite its advantages, challenges such as high initial investment costs, data security risks, AI bias in supplier selection, and regulatory compliance pose barriers to widespread adoption. This paper also provides actionable insights into overcoming the challenges and explores future trends, including AI-powered predictive analytics, robotics in stadium operations, circular economy initiatives, and blockchain-integrated fan engagement strategies.

Keywords

Smart Procurement, Sports Industry, AI in Procurement, Blockchain, Supply Chain Management, IoT, Sustainability, Digital Transformation, Cost Efficiency

1. Introduction

The global sports industry, valued at over $600 billion (Dempo et al., 2016), encompasses professional leagues, stadium operations, merchandising, sponsorships, and large-scale events such as the Olympics and FIFA World Cup. The complexity of managing supply chains in this ecosystem necessitates efficient procurement systems that optimize costs, minimize risks, and enhance transparency.

However, traditional procurement in sports has been plagued by inefficiencies, including siloed supplier networks, manual processes, and inconsistent pricing models. Artificial Intelligence (AI) into procurement processes can enhance efficiency, cost management, risk mitigation, and supplier relationships. (Waditwar, 2024). The adoption of AI-driven, blockchain-backed, and IoT-powered procurement solutions is bridging these gaps, leading to faster, more cost-effective, and transparent decision-making.

Procurement in sports involves managing an extensive supply chain that includes:

- Player and team equipment—From jerseys, shoes, and gear to advanced wearables and performance analytics tools.
- Stadium operations—Infrastructure, maintenance, security, catering, and hospitality services.
- Event logistics—Transportation, broadcasting technology, ticketing systems, and sponsorship deals.
- Merchandising and licensing—Manufacturing and distribution of branded merchandise.

Current Challenges in Sports Procurement

Traditionally, procurement in the sports industry has been fragmented, costly, and inefficient, often relying on manual processes, siloed supplier networks, and inconsistent pricing models. However, as the sports sector embraces digital transformation, smart procurement solutions are revolutionizing how teams, venues, and major sporting events optimize their supply chains, reduce costs, and enhance transparency.

2. Smart Procurement Technologies and Their Impact

Modern procurement strategies are leveraging AI, blockchain, IoT, and data analytics to enhance decision-making, mitigate risks, and drive efficiency. The method is as follows.

2.1. AI-Driven Procurement Optimization

Sports organizations are now using AI driven procurement platforms to analyze supplier performance, negotiate contracts, and make data-backed purchasing decisions. AI helps teams optimize inventory levels for merchandise, training gear, and stadium supplies, reducing unnecessary costs.

Machine learning (ML) algorithms play a critical role in modern procurement, offering capabilities such as predictive analytics, risk assessment, and automated decision-making. Some commonly used AI techniques include:

- Supervised Learning Models (e.g., Random Forest, XGBoost) for supplier performance evaluation.
- Unsupervised Learning (Clustering) for categorizing vendors based on pricing trends and quality metrics.
- Natural Language Processing (NLP) for contract analysis and anomaly detection.

2.2. Blockchain for Secure and Transparent Procurement

Blockchain technology in procurement enhances contract enforcement, fraud prevention, and payment verification through decentralized, immutable records. Key benefits include:

- Smart Contracts: Reduce contract approval time by 50% and eliminate disputes in sponsorship agreements as per the market data.
- Decentralized Bidding Platforms: Improve transparency in venue construction and vendor selection.

2.3. IoT for Real-Time Supply Chain Management

IoT sensors in stadiums and training facilities provide real-time monitoring of equipment, merchandise, and food supplies. Benefits include:

- Significant reduction in food waste through automated replenishment systems.
- Real-time tracking of player gear and equipment, ensuring optimal inventory levels.

2.4. Automated Procurement Workflows

Automation streamlines the procurement lifecycle from supplier selection to purchase order processing, reducing delays and manual errors.

2.5. Sustainability & ESG Compliance in Procurement

With the increasing focus on environmental and social governance (ESG), sports organizations are sourcing eco-friendly materials, reducing carbon footprints in logistics, and ensuring compliance with ethical labor practices.

With digital transformation accelerating, smart procurement is no longer a luxury but a necessity. As organizations embrace AI-driven decision-making, automation, and blockchain security, the sports industry is set to become more cost-

efficient, transparent, and sustainable than ever before (Sarker, 2021).

This paper provides actionable insights into how sports franchises, stadium operators, and event organizers can leverage technology to drive efficiency, maximize profitability, and deliver unparalleled fan experiences.

3. Smart Procurement Framework in the Sports Industry

The sports industry is rapidly evolving, driven by digital transformation, AI-powered analytics, and sustainability initiatives. Procurement plays a vital role in ensuring teams, stadiums, and sporting events operate smoothly, efficiently, and cost-effectively. The Smart Procurement Framework integrates cutting-edge technology-driven solutions to optimize sourcing, supplier management, and purchasing across all aspects of sports operations.

Below is a detailed breakdown of the key elements in a Smart Procurement Framework for the Sports Industry.

3.1. Digital Procurement Platforms: Streamlining Vendor Management & Contract Automation

With the increasing complexity of procurement in sports, cloud-based procurement platforms such as SAP Ariba, Coupa, and Jaggaer provide end-to-end procurement automation for:

- **Vendor onboarding and supplier management**—Ensuring smooth collaboration with manufacturers, distributors, and service providers.
- **Contract lifecycle automation**—Managing sponsorships, supplier agreements, and service contracts digitally.
- **Real-time spending analytics**—Tracking procurement expenses and optimizing cost efficiency for stadiums, merchandise, and logistics.
- **Example**—FC Bayern Munich implemented SAP Ariba to streamline their procurement process, manage supplier relationships efficiently, and achieve cost savings by optimizing spending on everything from equipment to stadium supplies, allowing them to focus more on on-field performance and business operations (SAP and FC Bayern Success Story, n.d.).

3.2. AI and Machine Learning for Procurement Optimization

AI-driven procurement systems analyze vast amounts of historical data to optimize:

- **Demand Forecasting**—Predicting sales of sports merchandise, equipment, and event tickets to ensure optimal inventory levels.
- **Supplier Selection & Pricing Negotiation**—AI evaluates supplier performance, market trends, and pricing models to negotiate better deals. Automated Purchase Timing—AI recommends the best times to procure materials based on market fluctuations and seasonal demand.
- **Example**—NBA teams use AI-powered analytics to forecast jersey sales based on player performance and fan engagement, ensuring optimal production volumes and minimizing overstock (Shah & Shah, 2025).

3.3. Blockchain for Transparency in Contracts

Blockchain technology ensures secure, tamper-proof transactions between sports organizations, suppliers, and sponsors, reducing the risk of:

- **Fraudulent supplier practices**—Verifying vendor authenticity through immutable records.
- **Contract disputes**—Smart contracts automatically enforce predefined terms, payments, and conditions.
- **Financial mismanagement**—Every transaction is traceable and auditable, ensuring financial transparency.
- **Example**—The Tokyo 2020 Olympics tested blockchain-based contract management for vendor transactions, ensuring real-time tracking of supplier payments and regulatory compliance.

3.4. IoT in Sports Facility Management

Internet of Things (IoT) devices enhance stadium operations and event logistics by:

- **Monitoring food, beverage, and merchandise inventory**—IoT sensors track stock levels in real time to automate replenishment.
- **Reducing energy and waste costs**—Smart sensors optimize lighting, HVAC systems, and waste management for cost-efficient facility operations.
- **Enhancing fan experience**—IoT devices personalize fan engagement, from smart ticketing to AI-driven seating recommendations.
- **Example**—The Levi's Stadium uses IoT sensors to track food and beverage demand, ensuring optimal stock levels, reducing food waste significantly and improving concession efficiency (Deepakpuri, 2016).

3.5. Sustainability and Ethical Sourcing in Sports Procurement

Sports organizations are prioritizing sustainability by integrating:

- **Eco-Friendly Procurement**—Sourcing sustainable materials for stadium construction, sportswear, and merchandise.
- **Carbon Footprint Reduction**—Using low-emission supply chains and opting for renewable energy-powered venues.
- **Fair Labor & Ethical Sourcing**—Ensuring human rights compliance in manufacturing and supplier selection.
- **Example**—Adidas partnered with FIFA to create eco-friendly match balls made from 100% recycled materials, contributing to a sustainable sports supply chain.

With the integration of AI, blockchain, IoT, and sustainability initiatives, smart procurement is transforming how sports organizations source, negotiate, and manage supply chains. From automated contract management to AI-powered inventory planning, technology is driving cost savings, operational efficiency, and ethical procurement in the global sports industry.

This paper provides real-world case studies, strategies, and insights into how sports organizations can leverage smart procurement frameworks to gain a competitive edge in the rapidly evolving sports landscape.

3.6. Smart Procurement in Sports Industry Is Still Evolving

While AI-driven smart procurement is still emerging in the sports industry, several organizations have begun integrating AI to enhance their procurement processes. Here are some notable examples:

1) Nike's AI-Enhanced Supply Chain Management

Nike has implemented AI across its operations to optimize supply chain management. By leveraging AI-powered demand sensing and inventory optimization, Nike can better predict product demand, streamline inventory levels, and enhance supplier collaboration. This approach reduces waste, improves efficiency, and ensures timely product availability (aiexpert.network, https://aiexpert.network/case-study-how-nike-is-leveraging-ai-across-its-operations/?utm_source=chatgpt.com).

2) Adidas' AI-Driven Procurement Strategies

Adidas utilizes AI to analyze vast amounts of data related to supplier performance, market trends, and demand forecasts. This analysis enables Adidas to make informed procurement decisions, select optimal suppliers, and negotiate better terms. The AI-driven approach enhances transparency, reduces costs, and aligns procurement strategies with market dynamics.

3) Decathlon's Smart Inventory Management

Decathlon, a global sports retailer, employs AI to manage its inventory and procurement processes. By analyzing sales data, seasonal trends, and customer preferences, Decathlon's AI system forecasts demand and automates procurement orders. This ensures optimal stock levels, minimizes overstocking or stockouts, and enhances supplier relationships.

4) PUMA's Sustainable Procurement with AI

PUMA has integrated AI to promote sustainable procurement practices. The company uses AI to assess supplier sustainability credentials, monitor compliance with environmental standards, and predict the environmental impact of procurement decisions. This approach ensures that PUMA's procurement aligns with its sustainability goals and corporate responsibility commitments.

5) Under Armour's Supplier Risk Management

Under Armour leverages AI to assess and manage risks within its supplier network. The AI system evaluates factors such as geopolitical events, financial stability, and compliance records to predict potential disruptions. This proactive approach allows Under Armour to mitigate risks, ensure supply continuity, and maintain strong supplier partnerships.

These examples illustrate how leading sports organizations are adopting AI-driven procurement strategies to enhance efficiency, sustainability, and risk management within their supply chains.

3.7. Integration of Smart Procurement Platforms with Enterprise Systems

Following Table 1 shows the Smart Procurement platforms and their challenges.

Table 1. Comparative analysis of procurement solutions.

Platform	Strength	Limitations
SAP Ariba	Robust supplier management, integrates with ERP	Expensive, complex implementation
Coupa	AI-driven analytics, user-friendly UI	Limited blockchain integration
Jaggaer	Advanced sourcing analytics	High cost for small organizations

Integration Challenges

- Data interoperability issues when merging cloud-based procurement platforms with legacy ERP systems.
- Cybersecurity risks due to large-scale digital transformation.
- AI bias in supplier recommendations, requiring manual oversight.

4. Case Studies: Implementations of Smart Procurement in Sports Industry

4.1. Case Study 1: PUMA-Manchester City FC—AI-Driven Procurement for Merchandise Optimization

As one of the world's leading football clubs, **Manchester City FC** has a massive global fanbase that drives significant demand for team merchandise, including jerseys, training kits, and accessories. However, managing this demand efficiently posed a challenge, as traditional procurement methods relied on historical sales trends and seasonal demand cycles, often leading to overstocking or shortages of key products. PUMA, in collaboration with Manchester City FC, launched an innovative AI kit design platform, inviting fans to design the club's official third kit for the 2026/27 season. This initiative aimed to enhance fan engagement and democratize the design process (Fc, 2024).

A. Challenges Prior to Implementation:

1) Limited Fan Engagement in Design Process:

- Traditionally, fans had minimal involvement in kit design, leading to a passive relationship with the club's merchandise.
- Stockouts of popular jerseys (e.g., star players' kits) resulted in missed sales opportunities and dissatisfied fans, while overstocking led to excessive markdowns and revenue loss.
- Relying solely on internal design teams could result in repetitive or less diverse design concepts, potentially limiting creativity.

2) Unpredictable Demand Fluctuations:

- Player transfers, performance trends, and championship wins heavily influenced jersey sales, making it difficult to accurately forecast demand.
- The club often overestimated demand, leading to excess inventory costs or underestimated it, resulting in stockouts of high-demand player jerseys and limited-edition fan gear.

3) Manual Supplier Negotiations:

- Traditional procurement processes involved manual negotiations with multiple suppliers, causing delays in restocking and inefficiencies in price management.

B. Implementation of the AI Kit Design Platform:

The AI Creator tool, powered by DEEPOBJECTS, allowed fans to generate kit designs using text prompts, customization tools, and intuitive sliders. Fans could submit their designs, which were then evaluated through fan ratings and expert reviews. The winning design would be worn by players and made available for purchase (Roth, 2024).

C. Solutions Achieved through AI Implementation:

1) Enhanced Fan Engagement:

- By involving fans directly in the design process, the club fostered a sense of ownership and deeper connection, transforming supporters into active contributors.

2) Diverse Design Innovation:

- The platform harnessed the collective creativity of the global fanbase, resulting in a wide array of unique and culturally diverse design submissions.

3) Accurate Reflection of Fan Preferences:

- The voting mechanism ensured that the final design resonated with a majority of fans, aligning merchandise offerings with supporter desires.

D. Outcomes:

- **Record Participation:**
  - The initiative received an overwhelming response, with fans submitting numerous designs, indicating high engagement levels.
- **Positive Reception:**
  - The fan-designed goalkeeper kit, inspired by the net of a football goal and created using the AI tool, was worn on-pitch, marking the first instance of an AI-generated football kit being used in a professional match.
- **Strengthened Fan Loyalty:**
  - Empowering fans to influence official club merchandise fostered a stronger sense of community and loyalty among supporters.
- **AI-Driven Demand Forecasting:**
  - The system analyzed past sales trends, player performance, fan engagement on social media, and seasonal demand fluctuations to generate accurate sales predictions.

This case study illustrates how integrating AI-driven platforms can overcome traditional engagement challenges, leading to innovative solutions that benefit both the organization and its community.

4.2. Case Study 2: IoT-Enabled Smart Procurement for Stadium Operations—Johan Cruijff Arena, Amsterdam

Background:

The Johan Cruijff Arena is not only one of the most innovative stadiums in the

world by design, but it also serves as a platform for innovation with its ecosystem. Together with its partners Microsoft and Holland Innovative, they developed a state-of-the-art pitch platform, continuously monitoring the grass conditions and translating this data into insights for daily operations. This technology improved the quality of the pitch significantly while using less resources. The pitch platform is Internet of Things in practice and shows a lot of scaling potential towards other stadiums, other buildings (like smart housing), cities and other sectors (Bel, 2020). Even though it was technologically advancing time to time, managing its complex operations—including energy usage, procurement, crowd control, and maintenance—was becoming increasingly difficult. To improve efficiency, reduce costs, and create a seamless experience for fans, the stadium turned to IoT-enabled smart procurement and automation.

Challenges Before IoT Implementation:

1) Inefficient Energy Management.

- The stadium's energy consumption was unpredictable and costly, with traditional procurement methods unable to adjust real-time usage based on demand.

2) Unoptimized Inventory & Procurement

- The stadium struggled to forecast stock levels for food, beverages, and merchandise, leading to overstocking or shortages on matchdays.

3) Maintenance Issues & Unexpected Downtime

- Reactive maintenance strategies led to frequent breakdowns, unexpected operational delays, and higher repair costs.

4) Crowd Flow & Safety Concerns

- Managing large crowds efficiently was difficult, leading to bottlenecks and potential safety risks in high-traffic areas.

Solution: Smart IoT-Enabled Procurement & Operations System To tackle these challenges, Johan Cruijff Arena integrated IoT technology across multiple stadium operations, including:

1) AI-Driven Energy Procurement

- IoT-powered sensors & smart meters were installed across the stadium to monitor real-time energy usage.
- The system automatically adjusted lighting, HVAC, and power distribution based on event schedules and attendance levels.

2) Automated Inventory & Procurement Optimization

- AI-driven demand forecasting helped optimize procurement decisions for food, beverages, and merchandise, reducing excess inventory waste.
- Real-time supplier data ensured that critical items (e.g., beer, water, food supplies) were replenished automatically before they ran out.

3) Predictive Maintenance for Stadium Equipment

- IoT sensors were embedded in stadium infrastructure (e.g., elevators, escalators, air conditioning systems) to detect early signs of wear and tear.
- The predictive analytics system scheduled proactive maintenance, preventing unexpected failures and reducing downtime.

4) Real-Time Crowd Flow Optimization

- IoT-enabled cameras monitored crowd movement and optimized foot traffic flow, reducing congestion at entry points, food stalls, and exits.

AI-powered alerts helped security teams prevent overcrowding, enhancing fan safety and experience. Outcomes of IoT-Enabled Smart Procurement Implementation

1) 30% Reduction in Energy Costs

- Smart energy systems optimized power consumption, leading to significant cost savings and reduced environmental impact.

2) 20% Less Food & Beverage Waste

- AI-driven demand forecasting minimized over-ordering, reducing inventory waste while ensuring enough stock was available for peak matchdays.

3) 50% Reduction in Equipment Downtime

- Predictive maintenance led to fewer breakdowns, ensuring seamless operations throughout the stadium.

4) Enhanced Crowd Management & Security

- The real-time tracking system prevented bottlenecks, improving safety and the overall fan experience.

By implementing IoT-enabled smart procurement and AI-powered automation, the Johan Cruijff Arena has set a new standard for sustainable and intelligent stadium operations.

This case study proves that sports venues can dramatically improve efficiency, reduce costs, and enhance fan experiences by leveraging real-time data and predictive analytics.

4.3. Case Study 2: IoT-Enabled Smart Procurement for Stadium Operations—Mercedes-Benz Stadium

Background

Mercedes-Benz Stadium, home to the Atlanta Falcons (NFL) and Atlanta United FC (MLS), is renowned for its state-of-the-art facilities and commitment to enhancing fan experiences. A critical aspect of stadium operations is the efficient management of beverage services, which directly impacts both revenue and guest satisfaction. To address challenges in this area, the stadium implemented an Internet of Things (IoT)-enabled smart procurement system in collaboration with BarTrack.

Challenges Prior to Implementation:

1) Inventory Management Inefficiencies:

- Manual tracking of keg levels often led to discrepancies, resulting in either overstocking or stockouts during events.
- Inaccurate inventory data made it challenging to forecast demand accurately, leading to potential revenue losses.

2) Quality Control Issues:

- Inconsistent pour quality and temperature variations affected beverage taste, leading to customer dissatisfaction.

- Lack of real-time monitoring made it difficult to identify and address issues promptly.

3) Operational Inefficiencies:

- High volume and staff numbers made it challenging to ensure quality, reduce waste, and maximize efficiency.
- Manual processes were time-consuming and prone to human error. IoT-Enabled Solution:

To overcome these challenges, Mercedes-Benz Stadium partnered with BarTrack to deploy an IoT enabled beverage management system. This system utilized advanced sensors and real-time data analytics to monitor and manage beverage operations.

Key Features:

1) Real-Time Monitoring:

- Sensors installed in kegs and along beverage lines provided continuous data on temperature, pressure, and volume.
- Live dashboards allowed staff to monitor pour quality and detect anomalies instantly.

2) Data Analytics:

- The system analyzed pouring patterns, identifying trends and areas for improvement.
- Predictive analytics assisted in demand forecasting, optimizing inventory levels for upcoming events.

3) Automated Alerts:

- Immediate notifications were sent to staff when issues such as temperature deviations or potential leaks were detected.
- Automated alerts ensured rapid response, maintaining beverage quality and reducing waste.

Outcomes:

1) Increased Keg Yield:

- The implementation led to a 15% increase in keg yield, maximizing the utilization of each keg and reducing waste.

2) Reduced Pour Costs:

- There was a 3.6% decrease in pour costs, achieved through optimized inventory management and waste reduction.

3) Enhanced Operational Efficiency:

- The system streamlined operations, allowing staff to focus on customer service rather than manual monitoring tasks.

4) Improved Customer Satisfaction:

- Consistent beverage quality and availability enhanced the overall fan experience, leading to higher satisfaction rates.

The adoption of an IoT-enabled smart procurement system at Mercedes-Benz Stadium significantly improved beverage service operations. By leveraging real-time data and analytics, the stadium enhanced inventory management, reduced oper-

ational costs, and elevated the fan experience. This case study exemplifies how IoT solutions can effectively address complex challenges in large-scale event venues.

4.4. Case Study 3: Sustainable Procurement and Blockchain Exploration at Tokyo 2020 Olympics

Background

The Tokyo 2020 Olympic and Paralympic Games set a new benchmark for sustainability and ethical sourcing in mega-event management. The Tokyo Organizing Committee of the Olympic and Paralympic Games (TOCOG) prioritized sustainable procurement, supply chain transparency, and ethical labor practices, ensuring that all goods and services procured for the event aligned with globally recognized standards. To achieve these goals, TOCOG introduced the Sustainable Sourcing Code, a framework designed to ensure that all suppliers adhered to environmental, social, and ethical procurement principles. The initiative reflected Japan's commitment to the United Nations Sustainable Development Goals (SDGs) and corporate social responsibility (CSR) in global sports events. While blockchain technology was not directly used in procurement, its potential applications in crowd management and contact tracing were explored, showcasing the future potential of decentralized systems for event transparency and security (Tokyo Organizing Committee of the Olympic and Paralympic Games, 2020).

Challenges Before Implementation

1) Lack of Standardized Sustainable Procurement Guidelines

- Before Tokyo 2020, procurement guidelines for mega sporting events lacked uniform sustainability standards.
- The Olympic supply chain involved thousands of vendors, making it difficult to enforce ethical sourcing at every level.

2) Environmental Impact of Large-Scale Procurement

- Mega-events like the Olympics require significant material sourcing (stadium construction, uniforms, medals, merchandise, and food supplies), leading to high carbon footprints and waste production.
- Ensuring responsible material use was a challenge due to supplier diversity.

3) Supply Chain Transparency & Labor Rights Concerns

- Previous Olympic Games faced criticism for unethical labor practices in supply chains, including low wages, poor working conditions, and deforestation-linked raw materials.
- Verifying compliance with fair labor laws and environmental standards across global suppliers was difficult.

4) Pandemic-Driven Security & Crowd Management Issues

- The COVID-19 pandemic presented new challenges, requiring secure contact tracing, crowd control, and health monitoring for athletes and spectators.
- A system was needed to track movements and prevent outbreaks while maintaining privacy.

Solutions Implemented by TOCOG

1) Development of the Sustainable Sourcing Code

TOCOG established the Sustainable Sourcing Code, which included:

- **Eco-Friendly Materials Requirement:** Sourcing of materials with minimal environmental impact, including recycled metals for Olympic medals.
- **Fair Labor Certification:** Suppliers had to adhere to human rights and fair labor practices, with independent audits ensuring compliance.
- **Sustainable Food Procurement:** Ethical sourcing of food products, prioritizing local and organic ingredients to reduce carbon footprint.
- **Supply Chain Monitoring:** Multi-tier supplier evaluations to track sustainability adherence at every level.

2) Green Medal & Stadium Construction Initiatives

- **Medals Made from Recycled Electronics:** Tokyo 2020 was the first Olympics where all medals were crafted from recycled electronic waste, promoting e-waste reduction.
- **Sustainable Venue Construction:** The National Stadium used certified sustainable timber, and existing infrastructure was reused to reduce carbon footprint.

3) Blockchain Exploration for Security & Transparency

Although blockchain was not implemented in procurement, research was conducted into its applications for (View of Leveraging Blockchain Based Decentralized Apps for the Tokyo Olympics Amid the COVID-19 Pandemic, n.d.):

- **Decentralized Contact Tracing:** Blockchain-based systems could securely track COVID-19 exposure while maintaining user privacy.
- **Crowd Flow Optimization:** A blockchain ledger could analyze and distribute crowd density data, preventing congestion in event venues.
- **Digital Ticketing & ID Verification:** Secure blockchain-based digital IDs were explored for fraud prevention and identity management.

4) Results & Impact of the Initiative

- **First Olympics with 100% Recycled Medals**—Showcased innovation in sustainable material sourcing.
- **Reduced construction waste and costs**—43% of Tokyo 2020 Venues Used Existing Infrastructure.
- **50% Reduction in Carbon Footprint** compared to previous Olympic Games.
- **Enhanced Supplier Accountability**—Transparent sourcing reduced risks of labor rights violations.
- **Blockchain Research Showcased Future Transparency Applications**—Set the groundwork for future Olympic Games to adopt decentralized technology.

The Tokyo 2020 Olympics set new global standards for sustainable procurement and ethical supply chain management. The Sustainable Sourcing Code ensured that materials, labor, and procurement processes aligned with environmental and ethical standards. While blockchain was not implemented in procurement, research into its potential for crowd management and contact tracing highlighted its promise for future sports events.

Tokyo 2020's success paved the way for sustainability-driven procurement pol-

icies in megaevents, ensuring that future global competitions prioritize transparency, environmental responsibility, and fair labor practices.

4.5. Case Study 4: NBA's Golden State Warriors—Sustainable Procurement for Arena Construction

Background

The Golden State Warriors, one of the most successful franchises in the NBA, sought to build a state-of-the-art arena, Chase Center, that not only provided a world-class fan experience but also adhered to environmentally sustainable procurement practices. The organization recognized the growing importance of sustainability in sports infrastructure and aimed to set a new benchmark for green arena construction. With an increasing focus on climate change and corporate social responsibility, the Warriors' objective was to ensure that every phase of the Chase Center's construction, from materials sourcing to operational efficiency, aligned with sustainable procurement strategies (Eco Refill Solutions, 2024).

Challenge: Implementing a Green Procurement Strategy in Arena Construction

Building a large-scale, high-tech sports and entertainment venue while ensuring sustainability posed several challenges:

- **High Carbon Footprint from Traditional Construction Methods**—Arena construction typically relies on energy-intensive materials such as concrete and steel, which contribute significantly to carbon emissions.
- **Sourcing Sustainable Building Materials**—Ensuring that all materials used in the construction of Chase Center met environmental standards while maintaining structural integrity and durability.
- **Energy Efficiency & Water Conservation**—Large arenas consume huge amounts of electricity and water, making it crucial to implement energy-efficient and water-saving technologies.
- **Aligning Supplier Selection with ESG Goals**—The team needed to partner with vendors and contractors who adhered to green manufacturing and ethical sourcing practices.

Solution: Adopting Sustainable Procurement for Chase Center Construction

To address these challenges, the Golden State Warriors integrated sustainability into every aspect of procurement for the Chase Center's development. The approach included:

- **Sourcing Recycled & Eco-Friendly Building Materials**—The team used recycled steel, low-carbon concrete, and sustainable wood to minimize the environmental impact of construction.
- **Energy-Efficient Infrastructure & Smart Lighting**—Installed LED lighting throughout the arena, reducing energy consumption by 50% compared to traditional lighting. Implemented smart HVAC and ventilation systems to optimize energy use.
- **Water Conservation & Waste Management**—Designed rainwater harvesting and water recycling systems to minimize freshwater usage. Incorporated zero-

waste strategies by ensuring construction debris was repurposed or recycled.

- **Sustainable Supplier Partnerships**—Partnered with green-certified suppliers that followed ethical labor and low-emission manufacturing practices. Required vendors to comply with LEED (Leadership in Energy and Environmental Design) standards.
- **Public Transportation & Green Mobility Support**—The Chase Center was designed with easy access to public transit, bike lanes, and electric vehicle (EV) charging stations to reduce its transportation-related carbon footprint.

Outcome: Sustainability Achievements & Business Impact

The Warriors' commitment to sustainable procurement and green building practices resulted in significant environmental and business benefits:

Outcomes:

- **Environmental Impact:**
  - The sustainable initiatives implemented at the Chase Center have significantly reduced environmental impact through energy efficiency, water conservation, and waste reduction.
- **Community Engagement:**
  - The Supplier Diversity Program has strengthened ties with the local community by supporting minority and women-owned businesses, fostering economic growth and inclusivity.
- **Industry Leadership:**
  - By achieving LEED Gold certification and implementing comprehensive sustainability measures, the Chase Center serves as a model for future sports and entertainment venues aiming to balance performance with environmental responsibility.

The Golden State Warriors' Chase Center project demonstrates how sustainable procurement can revolutionize sports infrastructure development. By integrating eco-friendly materials, energy efficient technologies, and green supplier partnerships, the team:

- Minimized environmental impact while building a world-class venue.
- Set a new standard for sustainability in sports arenas.
- Boosted fan engagement and corporate sponsorships through strong ESG initiatives.

This case study highlights the importance of sustainability in sports procurement and serves as a model for future stadiums and entertainment venues looking to embrace green construction and responsible supply chain practices (Chase Center Becomes Certified Green Business of the City and County of San Francisco, n.d.).

5. Future Trends in Smart Procurement for Sports

5.1. AI-Powered Predictive Analytics for Ticketing and Merchandise

AI is transforming how sports teams and event organizers optimize ticket sales

and merchandise inventory.

By analyzing historical sales data, fan behavior, social media trends, and real-time demand signals, AI-powered predictive analytics enables teams to:

- **Forecast Game-Day Demand:** AI systems predict how many tickets will sell for specific matches, helping teams set dynamic pricing strategies to maximize revenue while ensuring optimal stadium occupancy.
- **Optimize Merchandise Stocking:** By assessing past purchase trends and live data, AI ensures that high-demand jerseys, fan gear, and memorabilia are adequately stocked, preventing shortages or excess inventory.
- **Personalized Offers & Promotions:** AI-driven insights allow teams to personalize ticket promotions and bundle merchandise deals based on fan preferences, leading to increased sales and engagement.
- **Example:** The Los Angeles Lakers use AI-powered pricing models to adjust ticket prices dynamically, ensuring optimal revenue per game while offering competitive prices to fans.

5.2. Robotics and Automation in Stadium Operations

The integration of robotics and automation in sports stadiums is revolutionizing event-day logistics and procurement operations. Smart stadiums are leveraging autonomous systems for:

- **Automated Stadium Cleaning:** Robots handle post-game cleanup, ensuring stadiums are ready for the next event while **reducing** labor costs.
- **Food & Beverage Delivery:** AI-driven robots and drones deliver food and beverages directly to fans' seats, eliminating long concession stand queues.
- **Automated Merchandise Distribution:** Smart robotic systems manage warehouse inventory and streamline the procurement-to-delivery process for stadium merchandise stores.
- **Example:** Tokyo's Olympic Stadium deployed self-driving food delivery robots to serve guests during the Tokyo 2020 Olympics, enhancing efficiency and reducing human contact during the pandemic.

5.3. Circular Economy in Sports Procurement

In the fast-paced world of technology, innovation often takes center stage. But as the demand for cutting-edge devices, cloud computing, and digital services continues to grow, another critical priority is emerging: sustainability (The Procurement Compass, 2025). The circular economy approach is gaining traction in sports procurement, focusing on reusing, recycling, and reducing waste in equipment, uniforms, and venue operations. Key initiatives include:

- **Recycling & Repurposing Equipment:** Sports teams are recycling old jerseys, cleats, and training gear into new products, reducing landfill waste.
- **Sustainable Venue Materials:** Stadiums are implementing modular and recyclable materials to construct eco-friendly seating, flooring, and signage.
- **Second-Life Sports Gear & Apparel:** Many leagues are introducing programs

where fans can return old jerseys in exchange for discounts on new merchandise, promoting sustainable consumption.

- **Example:** Adidas partnered with Parley to produce a shoe upper made entirely of recycled ocean plastic and gillnets, setting a new standard for sustainable procurement in sports.

5.4. Fan Engagement through Smart Procurement

The fusion of blockchain, NFTs (Non-Fungible Tokens), and smart procurement is reshaping fan engagement strategies by allowing fans to directly interact with teams. Key innovations include:

- **Exclusive NFT-Based Merchandise:** Fans can purchase limited-edition digital collectibles, such as game-worn jersey NFTs or historic game moments, ensuring secure authentication and ownership.
- **Blockchain-Powered Fan Loyalty Programs:** Smart contracts enable real-time fan rewards, granting them access to VIP events, behind-the-scenes content, or early-bird tickets.
- **Decentralized Ticket Sales & Resale Transparency:** Blockchain eliminates counterfeit tickets and enables fair resale pricing through smart contract verification.
- **Example:** The NBA's Top Shot platform allows fans to own, trade, and sell iconic game moments as NFTs, integrating blockchain technology into the sports merchandise economy.

6. Ethical Considerations & Regulatory Barriers in Smart Procurement for the Sports Industry

6.1. Potential Challenges of Smart Procurement in Sports

- **AI Bias in Vendor Selection:** AI may unintentionally favor large suppliers with higher past transaction volumes, potentially sidelining smaller or emerging vendors.
- **High Costs & Privacy Issues:** Implementing blockchain for transparency and fraud prevention involves significant costs and data privacy concerns.
- **Ethical Sourcing & Fair Labor:** Ensuring supplier diversity and ethical labor practices remains a challenge in AI-driven procurement.

6.2. Regulatory Compliance in Smart Procurement for Sports

- **European Regulations:** The European Commission's AI Procurement Framework enforces transparency in automated decision-making, ensuring fairness in vendor selection.
- **U.S. Standards:** The National Institute of Standards and Technology (NIST) encourages blockchain integration in procurement to prevent fraud and enhance accountability.

In the sports industry, these considerations are critical for ensuring fair supplier selection, cost-effective implementation, and ethical procurement practices while

complying with international regulations.

7. Conclusion

Smart procurement has emerged as a critical enabler of cost efficiency, transparency, and sustainability in the sports industry. By leveraging AI-driven analytics, blockchain-backed contracts, and IoT-powered inventory tracking, organizations can optimize procurement cycles, reduce waste, and enhance financial performance.

However, implementing smart procurement solutions requires addressing technical barriers, ethical concerns, and integration challenges. Organizations must invest in robust data governance, ensure fair supplier selection algorithms, and navigate regulatory landscapes to maximize the benefits of digital procurement.

As the sports industry continues to evolve, AI, blockchain, and IoT will redefine procurement strategies, transforming how teams, leagues, and event organizers manage their supply chains. The future of sports procurement lies in data-driven, intelligent systems that streamline decision-making, ensure sustainability, and enhance operational agility.

The next decade will see greater AI automation**,** smarter stadiums, and a stronger commitment to sustainable sourcing**,** setting the stage for a future where sports and procurement work in perfect harmony. The future of sports isn't just about what happens on the field—it's about the intelligent systems that power it behind the scenes. Smart procurement isn't just an advantage; it's the key to staying ahead in the game.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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