

PLAYING IT SAFE: LEGAL AND ECONOMIC DIMENSIONS OF SPORT EVENT SECURITY

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Abstract. The issue of safety at sports mega-events, with a particular focus on football matches, has emerged as a pivotal concern for policymakers, event organisers and international governing bodies. Whilst such events are held to symbolise unity and cultural exchange, they also present substantial legal, economic and organisational challenges. The present study investigates the multifaceted issue of stadium safety by examining its legal frameworks, economic ramifications, and evolving technological solutions, employing football as the primary case study. The present study adopts a multidisciplinary methodology. A comprehensive review of the extant literature, encompassing academic studies, regulatory guidelines and institutional reports, established the theoretical foundation. A review of historical case studies was conducted to extract lessons from past failures in crowd management and emergency response. The case studies included the Hillsborough, Heysel, and Luzhniki disasters. Comparative and economic analyses were employed to evaluate safety investments in various regions and contexts, focusing on FIFA World Cup evaluations and national strategies, including those of the Latvian Football Federation. Additionally, the contributions of international legal instruments, including the Saint-Denis Convention, the Balance S4 Initiative and the Green Guide, to safety, security and services in stadium environments were evaluated. Finally, technological projects such as eVACUATE were analysed to determine their innovative contributions to predictive crowd modelling and emergency coordination. The primary objective of this research endeavour is to investigate the potential for aligning legal regulations, economic considerations, and technological innovation to engender safer and more inclusive sports environments. A fundamental concept in the analysis is the development of a "security culture", encompassing awareness, collaboration, adaptability, technological integration, and cultural sensitivity. The study emphasises the necessity of embedding this culture into stadium management, thereby highlighting the importance of implementing both preventive measures and rapid responsiveness to evolving risks, including the emergence of threats such as cyberattacks. The findings show that, although safety investments require significant financial commitments, the long-term costs of neglect, measured in terms of human lives lost, reputational damage and legal liabilities, far exceed the costs of prevention. Lessons from past tragedies emphasise the importance of consistently enforcing safety frameworks and integrating best practices into national policies. Furthermore, technological advances in crowd monitoring, evacuation planning and data-driven decision-making offer the opportunity to enhance existing protocols. In conclusion, the study argues that achieving sustainable safety at major sporting events requires international co-operation, standardised legal frameworks and balanced economic strategies. Future policy should focus on reducing disparities between countries with different resources, promoting a global culture of safety and investing in innovation driven by research. Such measures will ensure that sporting events remain secure, inclusive and celebratory occasions.

Keywords: mega sporting events, crowd control technologies, stadium liability, fan behaviour risks, evacuation planning, safety culture development.

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1. Introduction

The following definition of security culture, synthesising foundational principles widely recognised in both academic research and practical guidelines, in the context of major sporting events, can be proposed. The concept of security culture in major sporting events (henceforth referred to as MSE) pertains to the aggregate values, beliefs, and behaviours of stakeholders, including athletes, organisers, security personnel, and spectators, concerning safety and security measures. This encompasses how effective and user-friendly these measures are perceived to be, and is shaped by the sporting organisation's overarching culture, as well as the socio-political and geo-political environments in which the event occurs. The cornerstones of this security culture can be outlined as follows:

Awareness and education. It is crucial that stakeholders are informed about potential risks and the importance of security protocols. This includes providing staff with training and running awareness campaigns for spectators, in order to foster a proactive attitude towards safety.

Collaboration and communication. Effective communication between all parties involved, including event organisers, law enforcement, emergency services and attendees, is crucial. Working together enhances preparedness and response capabilities during crises.

Adaptability and responsiveness. It is essential to be able to adapt security measures based on real-time threat assessments. This flexibility enables quick responses to emerging risks or incidents during events.

Integration of technology. Using advanced technology for surveillance, crowd monitoring and emergency response can significantly improve security. This includes using data analytics to predict crowd behaviour and potential security breaches.

Cultural sensitivity. It is vital to recognise and respect the diverse backgrounds of participants and spectators in order to create an inclusive environment that fosters trust in security measures.

Continuous improvement. Learning from past incidents, such as the Hillsborough disaster, can inform better practices and policies for future MSEs. Regular reviews of security protocols ensure that they remain effective and relevant.

MSE can enhance safety for all participants and promote a positive atmosphere that prioritises enjoyment and engagement by establishing a robust security culture that incorporates these cornerstones.

2. Literature Review and Methodology

This article uses a multifaceted approach to examine the safety, legal and economic aspects of sports venue management, with a particular focus on improving stadium safety. The methods used are as follows:

Literature review. A thorough and meticulous examination of the extant academic research, industry guidelines, and historical case studies was conducted in order to establish a robust theoretical framework. The following sources have been identified as being of particular significance: The Guide to Safety at Sports Grounds (Green Guide) is an invaluable source of information on stadium safety standards and management. The Saint-Denis Convention, meanwhile, provides legally binding guidelines for integrated safety, security, and service approaches at sports events.

Reports from organisations such as FIFA and UEFA on the security risks and costs of major sporting events.

Case study analysis. A comprehensive review of historical case studies of stadium disasters, including the Heysel Stadium disaster, the Hillsborough disaster, and the Luzhniki Tragedy, was conducted. The insights provided by these studies offer valuable insights into the consequences of lapses in safety measures, thereby informing recommendations for policy and infrastructure improvements.

Comparative analysis. A comparison of safety measures and economic investments across different regions and organizations was performed. This included: assessing investments in stadium safety in Europe and globally, as highlighted in FIFA's 2026 World Cup Bid Evaluation Report, and evaluating the economic costs of disasters versus the costs of preventive safety measures.

Policy and legal framework examination. The article delves into legal documents and standards that govern stadium safety, including: national legislation such as Latvia's Civil Protection and Disaster Management Law, EU-level guidelines and conventions, including their implementation challenges.

Economic impact assessment. The economic aspects of disasters and safety investments were analysed using financial data, including budget allocations for safety at major sporting events and economic models that assessed the return on investment of safety measures.

Use of technology and data analysis. Innovative solutions for stadium safety were highlighted by reviewing advanced tools and technologies for crowd management and evacuation modelling, such as the eVACUATE platform.

This multidisciplinary approach ensures a comprehensive understanding of the subject, enabling the formulation of practical recommendations for improving safety at sporting events and addressing economic and legal issues.

2.1. The Balance S4 Initiative

The Balance S4 project addresses the critical need for safe and welcoming environments at sporting events, which are among the most significant non-

governmental activities in Europe. Given that sports attract large crowds and elicit strong emotions, ensuring the safety of attendees and tackling violence is of the utmost importance. This initiative is in line with the core values of the EU and the Council of Europe, which emphasise social cohesion and tolerance.

Recognising that liberty and security are foundational principles for both organisations, the Council of Europe is committed to ongoing collaboration with the EU to enhance safety, security and services at sporting events. Building on the success of previous projects such as ProS4 and ProS4+, the Balance S4 initiative aims to provide updated information on safety and service measures, raise awareness through workshops, and implement the best event organisation practices.

The project aims to reinforce the often-overlooked pillars of safety and service, which are essential for creating inclusive and accessible sporting environments. Leveraging the Saint-Denis Convention and utilising the expertise of professionals in the field, Balance S4 will facilitate knowledge sharing among stakeholders, ultimately striving to make sports events safer and more enjoyable for all participants (Council of Europe, EU, 2024). The project aims at achieving the following results: up-to-date information and data on the safety and service pillars at sports events in Europe; awareness-raising and capacity-building among all partners involved in the organisation of sports events, through workshops and seminars; enhanced implementation of the safety and service pillars in the organisation of sports events; and Guidance on safety and service at sports events (Council of Europe, EU, 2024).

The project builds on the reach of the Council of Europe and the Saint-Denis Convention, which has been ratified by 29 Member States and signed by a further 10 as of January 18, 2024. It will utilise the expertise of safety and service professionals to emphasise the importance of these measures in organising sports events, which is often overlooked. The project aims to provide verified best practices for improving the fan experience and ensuring safety. It will also create a forum for stakeholders to share knowledge and drive improvements in sports event management.

The Balance S4 project aims to promote the standards set out in the Council of Europe's Convention on an Integrated Safety, Security and Service Approach at Football Matches and Other Sports Events (the Saint-Denis Convention). It is the only binding international legal instrument establishing co-operation between the various stakeholders involved in organising sports events.

The Convention promotes an integrated, multi-agency approach based on three interdependent pillars: safety, security and service. These pillars are

interconnected and must be balanced; they cannot be designed or implemented in isolation.

So far, most member states have developed knowledge and expertise primarily in the security pillar. The Balance S4 project will now reinforce the safety and service pillars in order to strike the right balance. The project has the following specific objectives: 1) collecting and analysing information on existing safety and service arrangements, and good practices for promoting safer infrastructures, inclusion, diversity, accessibility and non-discrimination at sports venues; 2) supporting the exchange of knowledge and expertise on these topics between relevant stakeholders; 3) delivering multilateral guidance, awareness-raising and training/capacity-building activities, as well as awareness-raising materials, to Council of Europe (CoE) member states; 4) carrying out media and communication activities, such as press releases, creating a dedicated website and establishing a social media presence. The overall expected outcome is to make sports events safer, more secure, more inclusive and more welcoming. This will allow everyone to enjoy the magic of sporting moments without worrying about safety issues, misbehaving spectators or violence.

The specific objectives align with the Saint-Denis Committee's Policy Strategy for 2021–2025, particularly with regard to establishing a system to identify priority areas for balancing the three pillars, and to ensure that the dimensions of human rights, hate speech, anti-racism and anti-discrimination are streamlined in the Committee's standards-setting work (Council of Europe, EU, 2024).

2.2. eVACUATE project

Additionally, the eVACUATE project, which ran from April 2013 to May 2017 and involved participants from Belgium, France, Germany, Greece, Italy, the Netherlands, Spain and the United Kingdom, developed a platform to improve crowd evacuation during emergencies. This platform utilises advanced technologies to predict crowd behaviour and enhance situational awareness. The system aims to streamline emergency responses, reduce evacuation times and ultimately save lives during crises at large gatherings. Key features of the eVACUATE platform include crowd behaviour detection models that use visual, thermal and hyperspectral imaging to identify unusual collective and individual behaviour. The platform also offers software tools that can forecast potential crushes and generate optimum evacuation routes, as well as a simulation platform that provides decision-makers with a clear picture of situations before, during and after evacuations in indoor and outdoor environments. The platform also features a communication gateway that enables different applications to interoperate efficiently. The "Smart

Spaces" concept provides situational awareness and dynamic routing by installing innovative sensors and displays in public places.

The platform was validated in four pilot scenarios: a football stadium, a cruise ship, an airport and an underground station. It improves coordination between emergency services by providing a unified response mechanism that transforms police, fire brigades and medical teams into a cohesive force. The project also represents a step towards the standardisation of evacuation equipment and processes at EU level.

The eVACUATE system aims to reduce disaster costs, enhance security perceptions, and free civil protection organisations from costly vendor lock-ins. As a modular system, it allows organisations to select equipment according to their particular needs, including pricing, performance and bandwidth (European Commission, 2019).

2.3. The Green Guide

Ensuring safety at sports grounds requires a balance of effective management and strategic design. The Guide to Safety at Sports Grounds, also known as the Green Guide, is the world's leading resource on this subject. It provides comprehensive safety guidance for sports grounds in the UK and Europe. Sports ground owners, operators, architects and designers use the Green Guide as a best practice manual for developing and refurbishing stadiums to ensure they meet the highest safety standards. The Green Guide started life as a slim A4 pamphlet offering straightforward advice to football clubs. First published in 1973 in the aftermath of the Ibrox disaster, it has evolved into the definitive global resource on sports safety. The second edition, published in 1986, included findings from the Bradford Stadium fire report. The third edition, published in 1990, responded to the Hillsborough disaster. The fourth edition, published in 1997, added guidance for disabled spectators. The fifth edition, published in 2008, covered risk management and counter-terrorism. The sixth edition, published in 2018, introduced the Zone Ex concept and technological updates. The next edition is expected in 2028/29 (Sports Grounds Safety Authority, 2024).

The key themes of the Green Guide can be distilled as follows: the development of the principles of safety, security and service; movement and circulation; fire engineering; the embrace of "other sports"; the harmonisation with BSEN standards; and counter-terrorism issues (ESSMA, 2018).

The guide helps sports grounds calculate a safe capacity for their venue and offers guidance on security measures, such as educating fans about the importance of security queuing and the time this requires, creating safe and secure fan zones (which often accommodate more fans than the stadium itself), and checking fans

before they enter the stadium via manual pat-downs, metal detectors or X-rays (which can impact the hourly rate of passage).

Overall, the Green Guide is an invaluable resource for ensuring the safety and security of spectators at sports events across Europe, offering best practice guidelines for stadium design, management and security protocols (BS EN standards).

The Green Guide emphasises the importance of effective crowd management for ensuring safety at sports grounds. The key aspects of crowd management outlined in the guide include:

Safe Capacity Calculation

Determining capacity. It is crucial to establish the safe capacity of a venue. This involves assessing factors such as the physical layout and seating arrangements to ensure that the venue can accommodate the expected number of spectators safely and that there is adequate space for egress in case of an emergency.

Management and Stewarding.

Planning and responsibility. A well-defined management structure is essential for ensuring crowd safety. This involves appointing a safety officer, creating a spectator safety policy and ensuring all staff are trained in and competent at crowd management practices.

Stewarding. Trained stewards play a vital role in crowd management. They are responsible for monitoring crowd behaviour, assisting with entry and exit processes, and providing information to spectators. Effective communication and debriefing practices are also essential for stewarding operations.

Circulation and egress.

Ingress and egress management. The guide emphasises the importance of managing the flow of spectators entering and leaving the venue. This involves providing enough entry points, monitoring crowd build-up and designing clear, effective exit routes, which facilitate a quick evacuation if necessary.

Emergency planning.

Contingency plans. It is crucial to develop contingency plans for emergencies. This involves devising strategies for crowd control in the event of an unexpected incident, ensuring staff are aware of their roles and maintaining clear communication channels.

Crowd behaviour monitoring.

Monitoring and control. Implementing systems to monitor crowd behaviour and density can facilitate real-time adjustments to crowd management strategies. This can include using technology to count spectators and assess crowd dynamics (Department for Culture, Media and Sport, 2008).

Overall, the Green Guide is an invaluable resource for sports ground operators, providing them with the tools to implement effective crowd management strategies and ensure the safety and security of all attendees during events. The frameworks and initiatives

referred to in this chapter demonstrate a growing recognition of the need for an integrated approach to crowd management. They emphasise the importance of collaboration, planning and proactive measures to ensure spectators' safety and enjoyment at sporting events. As various frameworks and innovations designed to enhance safety and security at sporting events are explored, it becomes evident that these measures are essential in preventing potential disasters, rather than being mere theoretical constructs. The Green Guide, the eVACUATE project and other initiatives emphasise a proactive approach to crowd management that prioritises spectator well-being. However, despite these advancements, history has shown us that overlooking safety can have catastrophic consequences. In the next chapter, the authors will explore the tragic events that have occurred on sports fields around the world, demonstrating the severe consequences of insufficient safety measures. By examining notable disasters such as the Hillsborough, Heysel Stadium and Luzhniki tragedies, the authors will demonstrate the devastating consequences of lapses in crowd management and emergency preparedness. These case studies serve as poignant reminders of the critical importance of implementing robust safety protocols and learning from past mistakes, in order to prevent such tragedies from happening again.

This chapter addresses critical frameworks and initiatives aimed at enhancing safety and security during sporting events. Key components include: the Green Guide, eVACUATE project, the Balance S4 Initiative, and the Council of Europe Convention on an Integrated Safety, Security and Service Approach at Football Matches and Other Sports Events (Saint-Denis Convention).

Collectively, these frameworks contribute to the establishment of safer and more secure environments for spectators worldwide. They also reflect a growing recognition of the need for integrated approaches to crowd management, emphasising the importance of collaboration, planning, and proactive measures to ensure the safety and enjoyment of spectators at sporting events.

2.4. Saint-Denis Convention

The Saint-Denis Convention (Council of Europe, 2016) is the first legally binding international treaty to focus on safety, security, and service at sports events, with a particular emphasis on football matches. The overarching objective of the initiative is to establish a secure, welcoming, and inclusive environment for spectators, participants, and local communities both within and in the immediate vicinity of sports venues. This comprehensive framework is based on the European Convention on Spectator Violence and Misbehaviour at Sports Events, particularly at Football

Matches (Council of Europe, 1985), and introduces an integrated, multi-agency approach to managing sports events. The Convention emphasises that safety, security and services are interdependent and must be considered together. This approach requires collaboration between public authorities, private entities and other stakeholders, including local communities and fan organisations. This partnership approach is essential in reducing risks, preventing violence and ensuring that all attendees have a positive experience.

The Convention applies to all professional football matches and other sports events that pose safety or security risks. It defines "safety measures" as those that protect health and well-being, "security measures" as those that prevent violence and disorder, and "service measures" as those that ensure comfort and inclusivity. For these measures to be effective, they must be coordinated and integrated. The Convention requires each participating country to set up national and local coordination mechanisms in order to implement this integrated approach. These mechanisms should involve all relevant public and private agencies and clearly define their respective roles and responsibilities. Regular risk assessments and information sharing are also essential components of this process.

The Convention sets out requirements for stadium design, infrastructure and management, ensuring that they meet the necessary safety, security and service standards. These include regulations on crowd management and the use of pyrotechnics, as well as provisions for addressing discriminatory behaviour. Stadiums must also provide facilities that are accessible to all spectators, including those with disabilities.

The Convention addresses safety and security in public spaces beyond stadiums, where fans gather before and after events. It promotes proactive communication with supporters and local communities, encouraging their involvement in creating a safe and welcoming atmosphere. It recommends social, educational and crime-prevention initiatives to foster mutual respect among all stakeholders. The Convention calls for policing strategies that align with its integrated approach. These include intelligence gathering, continuous risk assessment, proportionate interventions and effective dialogue with supporters. It also emphasises the importance of international co-operation when it comes to sanctioning individuals involved in violence or disorder.

In recognition of the global nature of sporting events, the Convention promotes international co-operation in the sharing of best practices and information. National Football Information Points (NFIPs) have been set up within police forces to facilitate international coordination and the exchange of expertise in managing football-related safety issues. Composed of leading government and police experts from all 27 EU Member States and associated countries,

this network currently has 38 active members. The network was established in 2001 in response to serious incidents of football-related violence during the 1998 FIFA World Cup in France and the UEFA Euro 2000 tournament in Belgium. The NFIP network was initiated by the interior ministries and policing specialists of Belgium, Germany, the Netherlands and the United Kingdom. It aims to develop harmonised, Europe-wide measures to prevent and manage football-related violence and public disorder, thereby minimising risks to spectators and nearby communities (NFIP, n.d.). The Committee on Safety and Security at Sports Events monitors the Convention, oversees its application, recommends improvements and facilitates the exchange of information among states. Amendments to the Convention can be proposed and adopted through a structured process involving all relevant parties. The Convention is a significant step forward in the governance of the safety, security and services of sports events. By promoting a holistic and co-operative approach, the Convention aims to enhance the sports experience for everyone involved, ensuring that events are safe, secure, welcoming, and inclusive.

Unlike its neighbouring countries Lithuania and Estonia, Latvia has neither signed nor ratified this normative act (Council of Europe, 2017). As Zalcmane K. mentioned, signing and ratifying the Convention may not lead to significant sports reforms in some countries, but it does present challenges. Participants must adopt new regulations for stadium licensing,

design and infrastructure to ensure compliance with international standards. This includes addressing issues such as sanitation, accessibility, ticket sales and security, including counter-terrorism measures and fan segregation. Countries will need to amend their laws to tackle violence and hooliganism, and the Convention may impose sanctions. A key innovation is the establishment of the National Football Information Point (NFIP) and its integration into law enforcement, which poses challenges for implementation. Additionally, the Convention outlines critical measures including personalised fan identification, increased co-operation between authorities and fan groups, and the establishment of a safety and security committee to oversee compliance. It should also be noted that the effectiveness of any international treaty or new sports security law hinges on the establishment of appropriate legal frameworks and implementation mechanisms at the national level (Zalcmane, 2018).

3. Generalisation of the Main Statements

3.1 Tragedies on the Field: the Price of Overlooking Safety

Tragedies highlight the importance of adequate infrastructure, effective crowd control, well-planned emergency responses and trained security personnel in preventing such disasters in future (see Table 1).

Table 1

Visual comparison of the factual background and consequences of tragedies

	Hillsborough disaster	Heysel Stadium disaster	Luzhniki disaster
Date	April 15, 1989	May 29, 1985	October 20, 1982
Location	Hillsborough Stadium, Sheffield, England	Heysel Stadium, Brussels, Belgium	Central Lenin Stadium (Luzhniki Stadium), Moscow, USSR
Event type	FA Cup semifinal match between Liverpool and Nottingham Forest	European Cup Final between Juventus and Liverpool	UEFA Cup match between FC Spartak Moscow and HFC Haarlem
Number of fatalities	95 spectators killed	39 spectators killed	66 spectators killed
Main cause	Overcrowding due to poor crowd management and stadium design	Violence between rival fans led to a crush	Crowd management failures leading to a crush
Stadium design issues	Poorly designed pens with metal barriers cause confinement and crush risk	Inadequate fencing and barriers allow fan contact	Inadequate exits and icy conditions contribute to slips and falls
Crowd dynamics	Sudden influx of spectators into already crowded pens	Direct confrontation between rival fans	Panic was triggered by events on the field, causing a bottleneck at exits
Emergency response	Delayed response; limited medical resources available	Poor coordination by police; initial lack of awareness of the severity of the situation	Initial reports downplayed the severity; confusion among authorities
Legal consequences	Long-term investigations; changes in safety regulations across UK stadiums	UEFA banned English clubs from European competitions for five years; legal action against individuals involved	Four officials were charged with negligence; two received prison sentences
Cultural context	The context of football hooliganism was less pronounced; the focus on safety reforms post-disaster	Hooliganism was a significant factor contributing to the disaster	Increased repression of football fans in the Soviet Union following the disaster

Source: authored by the study's contributors

3.1.1. Heysel Stadium Disaster

The Heysel Stadium disaster occurred on May 29, 1985 during the European Cup Final between Liverpool FC and Juventus at the Heysel Stadium in Brussels, Belgium. This tragedy resulted in the deaths of 39 people and left around 600 more injured, marking one of the darkest days in footballing history. A combination of factors precipitated the disaster: hooliganism, poor stadium conditions and inadequate security measures.

England has long had a problem with football-related violence, particularly involving Liverpool fans. Tensions escalated when Liverpool supporters breached the flimsy fence separating them from Juventus fans, causing chaos and panic in the crowd.

The Heysel Stadium was over 50 years old and had failed safety inspections. It was also inadequately maintained. The stadium's compromised structural integrity contributed to the tragedy when a wall collapsed under the pressure of fleeing fans.

Local police officials appear to have mismanaged crowd control procedures, as evidenced by their decision to allow unruly fans into the stadium ahead of schedule, rather than detaining them. This decision served to exacerbate the situation, as it led to confrontations between rival supporters. As the match approached, tensions escalated, and Liverpool supporters began to throw objects into the neutral section, which was predominantly occupied by Juventus supporters. Following the breach of the barrier, Juventus supporters endeavoured to effect an escape, but found themselves unable to do so, being trapped against a collapsing wall. The subsequent crush resulted in suffocation and injuries, ultimately causing 39 fatalities, 32 of whom were Italian nationals.

Notwithstanding the unfolding tragedy, the authorities elected to proceed with the match, driven by the concern that cancellation might provoke further violence. Juventus ultimately emerged victorious with a 1-0 win; however, this triumph was eclipsed by the calamitous events that had transpired.

The aftermath of the Heysel disaster had significant repercussions:

Bans on English clubs. In response to the violence, UEFA imposed a five-year ban on all English clubs from participating in European competitions. Liverpool were initially given an additional three-year suspension, which was later reduced to one year.

Legal repercussions. Fourteen Liverpool fans were convicted of manslaughter and sentenced to three years in prison for their roles in the disaster. Several Belgian officials also faced charges relating to negligence in crowd management and stadium safety.

Long-term impact on football safety. The disaster prompted widespread discussions about safety standards at sports facilities across Europe. It brought to light urgent issues regarding crowd control, stadium

design and fan behaviour that must be addressed to prevent similar tragedies in the future.

The Heysel Stadium disaster is a poignant reminder of the potential consequences of hooliganism and inadequate safety measures at sports venues. It has catalysed ongoing efforts to enhance safety protocols and prevent a similar tragedy from happening again (Others, F.B.A., 2023; Goal, 2023; The Brussels Times, 2023; Royal Belgian Football Association, 2021; CNN Sports, 2023).

3.1.2. Hillsborough Disaster

The Hillsborough disaster occurred on April 15, 1989, during the FA Cup semi-final between Liverpool and Nottingham Forest. It resulted in the deaths of 95 spectators due to a catastrophic crush of the crowd at Hillsborough Stadium. The incident has been extensively analysed in an attempt to understand its causes and consequences, particularly with regard to safety protocols at sports facilities. The causes of the tragedy were crowd management failures, an inadequate emergency response and police oversight.

The configuration of the stadium's west stand proved to be a pivotal factor in the calamity that ensued. The area was divided by metal barriers that created confined spaces, particularly in pens 3 and 4, which became overcrowded when an additional 2,000 spectators entered these areas shortly before the commencement of the match. This surge in attendance resulted in a substantial increase in the number of spectators, leading to severe overcrowding and a subsequent crush as spectators surged forward to view the match. The emergency response was significantly impeded by a combination of miscommunication and a lack of preparedness. The initial calls for medical assistance were subject to delay, and the public address system was not utilised effectively to summon help until a point at which it was too late. The medical personnel present were overwhelmed by the number of casualties, with limited resources available for resuscitation. It is evident that the police failed to implement adequate crowd control measures. The inadequate management of the gates intended for entry and exit contributed to the build-up of crowds, as spectators were unable to escape the confined spaces created by the barriers.

Consequences of the tragedy are the following:

Loss of life and injury. The immediate consequence of this was the tragic loss of life, with 95 people dying as a result of crush asphyxia. A significant proportion of the victims were young individuals who suffered from neurological injuries due to prolonged asphyxia without clear external signs of trauma.

Long-term medical impact. Survivors were confronted with a number of significant medical challenges, including, but not limited to, neurological complications and psychological trauma. A significant

proportion of the subjects required intensive care for severe brain injuries, and some experienced long-term cognitive impairments or seizures.

Changes in safety regulations. In the aftermath of the Hillsborough disaster, there was a profound impact on safety regulations at sports venues across the UK. The incident prompted a comprehensive re-evaluation of crowd management practices and led to significant changes in stadium design, including the removal of standing areas and the improvement of emergency response protocols.

The Hillsborough disaster is a poignant example of the critical importance of effective crowd management and emergency preparedness in sports facilities to prevent such incidents in the future (The Hillsborough tragedy: James Wardrope, Frank Ryan, George Clark, Graham Venables, A Courtney Crosby, Paul Redgrave).

3.1.3. Luzhniki Disaster

The Luzhniki disaster occurred on 20 October 1982 during a UEFA Cup match between FC Spartak Moscow and HFC Haarlem at the Central Lenin Stadium (now known as the Luzhniki Stadium) in Moscow in the former Soviet Union. This tragic event resulted in the deaths of 66 people, primarily adolescents, and left 61 others injured, making it one of the worst sporting disasters in Soviet history. The Luzhniki disaster was caused by several factors: failures in crowd management, poor stadium design and panic triggered by events on the pitch. The Soviet police, known as *militsiya*, forced fans into a single stand to control the crowd better, leading to overcrowding on the icy stairs. This decision severely restricted the number of exits available, which contributed to the chaos when fans attempted to leave. The stadium's design and the layout of its exits were inadequate for managing large crowds. On that night, temperatures dropped below freezing, creating icy conditions that made movement difficult and dangerous.

Just before the match ended, Spartak scored a decisive second goal, causing many fans who had already started to leave to turn back and celebrate. This sudden change of direction caused a bottleneck at the exits, resulting in a crush as people struggled to navigate the slippery stairs.

In the final moments of the match, a woman fell down the stairs. Others stopped to help her, which caused a chain reaction as more people tripped and fell. This caused a domino effect, with more and more fans tripping and falling, resulting in a massive pile-up. Panic escalated as fans struggled to escape, resulting in compressive asphyxia for many victims. The official death toll was later confirmed to be 66, many of whom were teenagers aged between 14 and 19. The aftermath was characterised by confusion and denial on the

part of the authorities. Initial reports downplayed the severity of the incident, with state media only briefly mentioning casualties and providing no details.

The Luzhniki disaster had significant implications:

Official cover-up. In the immediate aftermath, the true extent of the disaster was covered up by the state. Information was suppressed, and it was not until 1989 that the official death toll was publicly acknowledged.

Legal repercussions. Four officials were charged with negligence relating to crowd control during the event. Two were found guilty and received three-year prison sentences, but one was released early due to amnesty.

Impact on fan culture. The disaster resulted in the increased repression of football fans in the Soviet Union. The state authorities intensified measures against gatherings of fans that were perceived as unruly or politically charged. This contributed to the radicalisation of fan culture in subsequent years.

The Luzhniki disaster is a significant yet often overlooked tragedy in sporting history. It serves as a stark reminder of the importance of effective crowd management and robust safety protocols in sports facilities, in order to prevent such catastrophes from happening again (The Guardian, 2008; Sportstar, 2019; Blaschke, 2018; Gognidze, 2012).

History remembers with sorrow several other stadium disasters including the Burnden Park disaster (England, 1946), the Estadio Nacional disaster (Peru, 1964), the Bradford City Stadium Fire (England, 1985), the Kathmandu Stadium disaster (Nepal, 1988), the Accra Sports Stadium disaster (Ghana, 2001), the Ellis Park Stadium disaster (South Africa, 2001), and the Port Said Stadium Riot (Egypt, 2012).

3.2. Economic Aspects of Safety and Disaster Management

These economic factors highlight that, although ensuring safety incurs significant initial costs, the potential economic consequences of neglecting it – such as loss of life, legal action and reputational damage – are far more severe. Striking the right balance between safety investments and economic considerations is a key challenge for stakeholders in the sports industry. As MSEs have grown in size and become more international, the need for a higher level of global security to ensure they run smoothly has increased. The United Nations Office of Counter-Terrorism (UNOCT) is working with the United Nations Interregional Crime and Justice Research Institute (UNICRI), the United Nations Alliance of Civilizations (UNAOC) and the International Centre for Sport Security (ICSS). In consultation with the Counter-Terrorism Committee Executive Directorate (CTED), they are jointly implementing sustainable security promotion programmes at MSE by issuing

a handbook. (United Nations Office of Counter-Terrorism, 2024).

MSEs are considered to be part of a nation's critical infrastructure and key assets. The primary objective of terrorist activity is to destroy or disable essential infrastructure and vital resources, resulting in mass casualties, economic damage, and a weakened national morale and confidence (Hall, Stacey A. et al., 2012). The security expenditures associated with MSE are considerable and rising, thus justifying their categorisation as a prudent long-term investment, akin to investments in infrastructure development. It is imperative to ascertain the requisite level of security measures and the appropriate investment level for each MSE. The budget allocated to security influences the overall budget of an MSE, as well as the economic situation of the host country. Consequently, a meticulous cost calculation is imperative to evaluate the country's capacity to host such an event. It should be noted that new and complex threats are constantly emerging around the world. Proper budgeting for security costs at the event planning stage will protect the host country from foreseeable threats and disruptions, ensuring the safety of athletes, spectators, organisers and service personnel (Richard Giulianotti, Francisco Klauser, 2010). The overall security budget for an MSE is the responsibility of the host country's government, who are also responsible for its management. This budget includes the planning and operational activities of law enforcement agencies, which are designed to ensure the smooth and peaceful conduct of an MSE before, during and after the event. To properly maintain security investments, it is also essential to secure multiple streams of public funding. The security budget must cover the protection of competition venues and critical infrastructure, both during and before/after an MSE. Security in public places, fan zones, fields and stadiums must be ensured. Traffic and evacuation routes and public transport must also be safe. In this area, the role of law enforcement agencies and private security companies is important (Statewatch, 2011).

To cover all aspects of planning, organising and implementing a MSE, it is necessary to develop a strategy that includes (United Nations Office of Counter-Terrorism, *supra* note 31): standards and requirements to prevent and counter criminal threats; solid legal and institutional bases aimed at facilitating co-operation and timely information exchange, often at the international level, between different agencies involved in the security process; solid legal provisions to ensure the protection of human rights; basic principles regulating public-private partnerships in relation to security matters.

For example, the International Ice Hockey Federation (IIHF) has developed the World Championship Event Code (International Ice Hockey Federation, 2024) that, among other things, provides

for all security and safety measures during the World Championships.

However, since football is the most popular sport in the world and FIFA is the highest governing body of football, the authors of the study will focus specifically on the analysis of football security risks and costs.

3.2.1. Balancing Costs and Risks in Global Football Mega-Events

Federation International Football Association (FIFA) World Cup Qatar 2022™, the first World Cup which be held in the Arab world. Although the security concept did not address the challenge of ensuring effective crowd management in sufficient detail, Qatar's compact World Cup concept was considered to offer security advantages. According to the 2022 FIFA World Cup Qatar, the security budget was 61.8 million USD (United Nations Office of Counter-Terrorism, *supra* note 31). FIFA uses a robust evaluation model to assess bids. Based on the information provided, it issues a Bid Evaluation Report to each bidding government, addressing weaknesses and gaps in the security strategy. The 2026 World Cup will be co-hosted by Canada, Mexico and the United States. This will be the first World Cup to be co-hosted by three geographically connected nations. The report focused on the infrastructure and commercial aspects of the event (United Nations Office of Counter-Terrorism, *supra* note 31).

According to the 2026 FIFA World Cup Bid Evaluation Report (FIFA, 2024), the budgeted safety and security costs were estimated at 11 million USD for Morocco 2026 and 99 million USD for the United Bid (Canada, the United States, and Mexico) 2026. The estimated expenditure for Morocco was assessed as being below the baseline, whereas the corresponding figure for the United Bid was considered above the baseline. The FIFA report evaluated the security and safety risk of Morocco 2026 as moderate, incorporating a range of factors in its analysis. In order to proceed with this matter, further information is required in terms of safety standards in stadiums. Such information must include the occupational competence of safety management personnel, as well as confirmation of staffing numbers. Recent incidents have given rise to questions regarding the levels of understanding and application of safe capacities, access control, and crowd management by stadium and policing authorities. This would need to be monitored if Morocco were appointed as the host country. Further clarification would also be required regarding the ultimate operational responsibility for managing stadium security and safety, including crowd management and stewarding. The FIFA report assessed the security and safety risks of the United Bid 2026 as low when several aspects were taken into account. All parties

have experience of regularly hosting MSE, and there are established arrangements in place for managing security and safety at stadiums and for high-profile individuals. However, a bid involving three host countries increases the risk of inconsistent approaches to security, which could have a negative impact. A joint bid involving multiple countries with federal structures could present challenges to intergovernmental co-operation regarding security and safety planning during the tournament's planning phase. After compiling information on security and safety risk levels and budgeted security costs, the authors summarised this in a table (See Table 2).

Table 2

2026 FIFA World Cup host country security and safety level

	Security and safety risk level	Budgeted security costs level
Morocco	MEDIUM	LOWER than baseline
United Bid (Canada, USA, Mexico)	LOW	HIGHER than baseline

Source: authored by the study's contributors

Following an evaluation of all risks and aspects, including security and safety risks, as well as budgeted security costs, it was decided that the 2026 FIFA World Cup will be hosted in three countries: Canada, the USA and Mexico. The total security budget is 99 million USD.

3.2.2. Security and Sustainability in Latvian Football

The Latvian Football Federation (LFF) is the only football association in Latvia recognised by FIFA and UEFA. It is responsible for developing football in the country and has the right to represent Latvia in FIFA, UEFA and other sports institutions. The LFF holds the exclusive right to organise and conduct football competitions at all levels (Latvian Football Federation, 2024). The LFF has developed a football social responsibility strategy, which provides for specific steps and principles with the mission of creating an open, accessible, and responsible football environment, adhering to the principles of a healthy lifestyle, personal growth, tolerance, and mutual assistance.

The strategy encompasses the enhancement of multiple internal processes and the formulation of pertinent guidelines concerning matters of child rights protection, environmental accessibility, and associated domains.

The total budget for LFF is as follows: 2021 – 10.7 million EUR; 2022 – 12.1 million EUR; 2023 – 13.1 million EUR; 2024 – 13.5 million EUR (Latvian Football Federation budget draft, 2021, 2022, 2023, 2024). The LFF General Secretary is directly responsible for all security and safety issues. Therefore, budget expenditure includes not only salaries for administrative staff and judges, but also for structural units responsible for developing security measures and calculations (see Table 3).

Effective administrative governance is essential for ensuring that football authorities, including the LFF, function properly. The LFF's budget cost item for "Administrative and Good Governance" increased by 428,400 EUR between 2021 and 2024, representing a 132% increase. The LFF's budget cost item for security, safety and fair play amounts to an average of 30 thousand EUR for the period from 2021 to 2024. Infrastructure support is a critically important element for development and security.

The UEFA Executive Committee has approved a set of ten good governance principles and rules developed by the European governing body. These principles and rules are also binding on Latvia as a UEFA member. The UEFA Good Governance Principles, which were adopted in 2018, are comprehensive, covering a wide range of football association activities and operations. These include aspects such as respect/fair play, health and safety/security, protection, and human rights. It is vital that these principles are reflected not only in the strategies and activities of the members, but also in the budgets of the organisations. Adhering to all these aspects and more will significantly reduce the potential for disaster and associated costs when organising large-scale sporting events, including football (UEFA, 2018).

Although Latvia has made initial progress in football safety governance, a broader regional comparison reveals areas for further development. Unlike Lithuania and Estonia, which have both signed or ratified the Saint-Denis Convention, Latvia has yet to adopt this binding framework. This hinders regional alignment in

Table 3

Latvian Football Federation (LFF) security budgeted costs, 2021-2024, EUR

Position	2021	2022	2023	2024
Administrative and good governance	323 900	625 000	625 800	752 300
Security safety and fair play	38 400	30 000	25 000	27 300
Infrastructure support	2 607 584	2 632 103	2 237 318	1 106 000

Source: authored by the study's contributors

stadium safety and indicates the need for more robust policy integration.

Although Latvia has a civil protection law and modest security budgets through the Latvian Football Federation, the implementation of international safety standards remains fragmented. Practical models for improvement can be found in neighbouring countries, such as Estonia's use of digital crowd monitoring and Lithuania's mandatory training for event staff.

In order to improve preparedness, Latvia could benefit from a centralised coordination mechanism and closer co-operation with its Baltic and Nordic partners. Adhering to international standards would improve safety outcomes and demonstrate Latvia's ability to host large-scale sporting events responsibly.

In order to ensure the coordination of actions in the event of a disaster, legislation has been implemented in Latvia in the form of the Civil Protection and Disaster Management Law (The Saeima, 2016). The purpose of the law is to determine the competence of the civil protection system and disaster management entities to ensure the safety and protection of people, the environment, and property as fully as possible in the event of a disaster or threat of a disaster. In accordance with Chapter 9 of the Law, Disaster Risk Assessment Recommendations (Valsts Ugunsdzēsības un Glābšanas dienests, 2018) have been formulated for disaster management entities, in co-operation with other ministries, and state and local government institutions, to assess risks at the national, regional, and/or local scale.

In Latvia, representatives of several professions are required to insure their general or professional civil liability. These include insurance brokers, pharmacists, security merchants, owners of dangerous goods, construction workers and specialists, accounting outsourcing companies, cash register and system service providers, conformity assessment institutions, insolvency administrators, surveyors and geodesists, public event organisers, certified forest inventory performers, sworn notaries, auditors and bailiffs. According to Regulations No. 298 of the Cabinet of Ministers of the Republic of Latvia, titled "Regulations on Compulsory Civil Liability Insurance of Public Event Organizers" (2007), general civil liability insurance for public event organisers is mandatory. The Regulations establish the liability limit and specify the minimum amount of insurance required, which depends on the number of participants in a mass sporting event (MSE). The minimum liability coverage for a single insured event is defined as follows: 2,845 EUR for events with up to 100 visitors and participants; 10,670 EUR for events with between 101 and 1,000 visitors and participants; and 14,230 EUR for events with more than 1,000 visitors and participants. However, should the MSE be intended for use with sources of increased

danger or pyrotechnics, this minimum insurance amount is increased twofold. The regulations stipulate the insurance contract provisions for recoverable expenses for MSE organisers. For instance, the insurer provides coverage for expenses arising from damage to the life or health of an individual during the course of an MSE, including the individual's medical treatment, incapacity for work, loss of working capacity, death (including losses incurred by the dependents of the deceased individual), the individual's burial, and damage to the individual's property or loss of property. Therefore, MSE organisers must anticipate all possible risks and protect themselves against them in advance. They should also include risk insurance in the MSE's overall security budget.

3.3. Risk Management in Stadiums during Mega Sporting Events

The security personnel responsible for ensuring safety and risk management in stadiums during MSE events are comprised of specialists from five different fields. As Stacey Hall (2010) asserts, the management of sports venues, the police, emergency management, firefighting, and emergency medical services are all pertinent areas of concern.

MSE organisers face risks of a large scale and scope associated with large gatherings. These include structural failures, medical emergencies (including fatalities), fire hazards and changes in weather conditions. These risks can impact not only health, but also behaviour, endangering tens of thousands of event workers and visitors. The top risks at every stadium are (William Gaunt, 2024): crowd control and stampedes; structural failures; evacuation procedures; fire hazards; weather-related risks; violence and fights; medical emergencies; lost children and missing persons; food safety; production and event equipment.

The sheer volume of people can lead to overcrowding, especially at entrances, exits, and concession areas. The phenomenon of overcrowding has been demonstrated to have the capacity to incite riots, with the potential to result in severe injury or death. It is imperative for MSE organisers to not only mitigate potential risks, but also to implement a comprehensive array of control measures before, during and after the event. Such measures may include crowd management strategies and the deployment of trained security personnel, in addition to the gradual filling of stadiums. Stadiums necessitate periodic maintenance due to the potential for structural failures, such as the collapse of stands or the fall of debris, which pose considerable risks to spectators and MSE participants alike. The consequences of such events can be disastrous. It is imperative that infrastructure facilities undergo regular inspections and maintenance. Furthermore, the establishment of emergency response

plans and evacuation procedures is essential. There is a very real chance that someone will require emergency medical care for conditions such as heart attacks, dehydration and physical injuries. Fires can originate from various sources, including electrical faults, cooking equipment in concession stands or discarded cigarettes. To mitigate weather-related risks, the stadium is equipped with weather monitoring systems, emergency shelters and clear communication systems, such as LED screens and loudspeakers, to warn of possible adverse weather conditions and direct people to safe shelter. If necessary, it is important that MSE participants can quickly find directions to help points. By implementing preventive and control measures in stadiums during the MSE, organisers can ensure comprehensive safety and prevent disasters and losses.

Cyberattacks are a distinct category of risk that warrants attention. These are malicious intrusions into computer networks or systems. Stolen data or compromised systems can result in financial loss for a company or institution, including MSEs, as well as damage to their ability to function digitally and their reputation. As Microsoft Security Insider shows, cyber threats are increasingly targeting sporting events and venues, including MSEs. The cybersecurity threats to sporting events and venues are diverse and complex. Events such as the World Cup and the Olympic Games present unique cyber risks that are often less visible than in other enterprise environments. With the global sports market valued at over 600 billion USD, it is a significant target for cyber threats. Sports teams, major leagues and global sports associations, as well as entertainment venues, hold valuable information that cybercriminals are eager to obtain (Microsoft, 2023). Cyberattacks can expose sensitive customer data, disrupt business operations and undermine consumer trust. Financial losses are just one of the threats posed by cyberattacks. If a company fails to protect its customers' proprietary data, it can lose their trust (McQuitty, Jake, David Cook, 2016).

The economic dimensions previously outlined demonstrate that, whilst ensuring safety entails considerable initial costs, the potential economic consequences of neglecting it – such as loss of life, legal action and loss of reputation – are significantly more substantial. A pivotal challenge for stakeholders in the sports industry is the balancing of safety investments with economic considerations.

4. Discussion

The findings presented above emphasise the multifaceted nature of stadium safety, intertwining legal frameworks, historical lessons, and economic considerations. This discussion explores these aspects in greater depth, examining their interconnections,

implications for stakeholders, and pathways toward sustainable safety in sports venues.

The analysis revealed that comprehensive safety frameworks, such as the Green Guide and the Saint-Denis Convention, play a key role in establishing standardised safety protocols across sports venues. They provide a structured approach to risk assessment, emergency preparedness and crowd management. However, case studies of tragedies demonstrate that such guidelines may be insufficient without rigorous implementation, enforcement and understanding of security culture. Persistent gaps in adherence highlight the need for ongoing oversight and integration of these frameworks into stadium management's operational ethos.

Furthermore, the eVACUATE project and the Balance S4 Initiative demonstrate how technological and organisational innovations can enhance safety. They emphasise real-time crowd monitoring, data-driven decision-making and the adoption of advanced evacuation systems. The favourable outcomes associated with these innovations suggest that the utilisation of technology can significantly enhance traditional safety measures, thereby providing a more dynamic and responsive approach to crowd management.

The economic analysis makes a strong case for investing in safety measures. Disasters impose substantial financial burdens in the form of immediate financial losses, compensation payouts and legal liabilities. For example, the Heysel Stadium disaster resulted in a tragic loss of life, severe reputational damage, and financial penalties for the clubs and organisations involved. These economic repercussions serve as stark reminders of the high costs of neglecting safety, creating a strong incentive for stakeholders to prioritise safety investments.

Conversely, the cost of implementing safety measures, such as infrastructure upgrades and technological investments, presents a significant financial challenge, particularly for smaller clubs and venues with limited budgets. Rising insurance premiums and the need for comprehensive coverage further exacerbate these financial strains. However, a cost-benefit analysis reveals that the long-term economic benefits of preventing disasters, such as sustained ticket sales, sponsorships and a positive reputation, often outweigh the initial investment costs. Adopting an economic perspective, we should view safety as a strategic investment, rather than merely an expense, which is essential for the sustainability and profitability of sports venues. Historical tragedies provide invaluable lessons that inform current safety practices. For example, the Heysel Stadium disaster and the Hillsborough disaster both highlighted critical failings in crowd control and emergency response. These events catalysed significant reforms, including

the transition to all-seater stadiums in the UK and enhanced police protocols during events. However, the recurrence of similar issues in subsequent disasters, such as the Accra Sports Stadium disaster (GhanaWeb, 2001), suggests that lessons from past disasters are not always fully understood or applied universally. This pattern highlights the need for global co-operation and the standardisation of safety practices in different regions and sporting contexts. International bodies such as FIFA, UEFA and the IOC play a crucial role in disseminating best practices and enforcing safety standards. Strengthening the influence of these organisations and ensuring that safety protocols can be adapted to various cultural and infrastructural contexts could enhance their effectiveness in preventing future disasters.

Despite advancements in safety frameworks and technologies, several challenges impede their widespread adoption. Economic disparities between developed and developing countries result in unequal capacities for implementing robust safety measures. Developing nations often have limited financial resources, inadequate infrastructure and insufficient training for security personnel, which makes it difficult for them to meet international safety standards.

Additionally, regulatory compliance poses ongoing challenges. The dynamic nature of sporting events, involving varying crowd sizes, diverse event types and different venue designs, requires flexible and adaptive safety protocols. Consistent compliance across these variables demands continuous monitoring, regular updates to safety guidelines and comprehensive training programmes for all stakeholders.

Looking ahead, achieving sustainable stadium safety will require innovative solutions and collaborative efforts. Technological advancements such as AI-driven crowd analytics, smart surveillance systems and modular evacuation infrastructure offer promising ways to improve safety. These technologies enable the real-time analysis of crowd behaviour, hazard prediction and rapid emergency responses, significantly reducing risks. Additionally, emerging trends suggest a transformative future for sports experiences. As media discussions have highlighted, the boundary between physical and digital attendance may fade within the next decade. Fans could engage with fully immersive digital replicas of stadiums, interact with AI-powered avatars of players and participate in co-creating content. This would make sports a more collective and inclusive experience than ever before (CNN Business, 2023).

Furthermore, it is essential to foster a culture of safety. This requires raising awareness and promoting accountability among all stakeholders, including event organisers, security personnel, fans, and local authorities. Educational programmes, regular safety drills and transparent communication can reinforce the

importance of safety, ensuring it remains a top priority in all areas of sports event management.

Economic incentives must be aligned with safety objectives. Governments and international bodies can provide grants and subsidies to support safety upgrades, particularly in areas with limited resources. Additionally, public-private partnerships can combine the strengths of different sectors, pooling financial resources and expertise in technology and management to implement comprehensive safety solutions. Lastly, continuous research and development are imperative. Ongoing studies into crowd dynamics, the effectiveness of disaster response, and the economic impact of safety measures can inform evidence-based policymaking and drive further innovations in stadium safety.

5. Conclusions

The Critical Role of Security Culture

Developing a robust security culture in sports mega-events is essential for ensuring the safety of athletes, spectators, and event staff. This requires fostering awareness, collaboration, adaptability, technological integration, cultural sensitivity, and continuous improvement.

Legal Frameworks Driving Safety Reforms

Initiatives such as the Saint-Denis Convention, the Balance S4 Initiative, and the Green Guide have laid the foundation for enhancing safety through integrated, multi-agency approaches. These frameworks highlight the importance of collaboration among public authorities, private entities, and community stakeholders.

Lessons from Tragic Incidents

Historical tragedies, including the Heysel Stadium, Hillsborough, and Luzhniki disasters, have demonstrated the devastating consequences of inadequate safety measures. These events have driven reforms in stadium design, crowd management, and emergency response strategies.

Economic Costs and Benefits of Safety Measures

Implementing safety protocols and upgrading infrastructure require significant investment; however, the economic and reputational losses resulting from disasters are far greater. Host countries must therefore balance the immediate financial costs with long-term benefits such as enhanced public trust and increased tourism revenues.

Emerging Risks and Technological Solutions

Modern challenges, including cybersecurity threats and terrorism, demand the adoption of advanced technologies such as real-time crowd monitoring, evacuation modelling, and integrated communication systems. Projects like eVACUATE illustrate how technology can transform safety practices in large-scale sporting events.

A Call for International Co-operation and Sustainability

Given the global nature of sport, international collaboration is vital for sharing best practices, standardising safety protocols, and creating inclusive, sustainable environments for all participants. Balancing the pillars of safety, service, and security remains a central challenge for future developments.

Safety and Risk Management at Stadiums

Effective safety and risk management during mass sporting events depend on a multidisciplinary security team and proactive strategies to address both physical and cyber risks. Through regular infrastructure maintenance, crowd management planning, emergency response systems, and advanced cybersecurity measures, organisers can mitigate diverse threats – from structural failures and medical emergencies to fire hazards, severe weather, and cyberattacks – ensuring the protection of participants and spectators while maintaining operational integrity and public confidence.

These conclusions emphasise the importance of taking a comprehensive and proactive approach to safety in sports, integrating legal, economic and technological factors to ensure the long-term viability of MSE.

Future research could focus on developing measurable indicators to assess stadium safety performance, as well as evaluating the practical implementation of international standards in smaller or less well-resourced

countries. Comparative studies across different regions, especially Central and Eastern Europe, would provide valuable insights into the most effective approaches to ensuring sustainable event security and the common challenges associated with this.

Author Contributions

- Marina Kamenecka-Usova: conceptualisation, supervision, legal framework analysis.
- Ilona Lejniece: economic analysis, methodology.
- Janis Zidens: data collection, case studies.

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