

LOGISTICS INFRASTRUCTURE MANAGEMENT OF MASS ART AND ENTERTAINMENT EVENTS

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Purpose: This article aims to present the management processes of various logistics infrastructure areas crucial for organizing mass events. It seeks to develop "good practices" for effectively managing the logistical infrastructure of large-scale gatherings.

Design/methodology/approach: The research method used to gather data on the infrastructural aspects of organizing mass events involved an analysis of literature, supported by field observations. The research material also includes internal documents and data collected through open, semi-structured direct interviews with organizers of mass events.

Findings: Managing the modern logistics infrastructure of mass events is a comprehensive process that necessitates meticulous planning, coordination, and control of activities related to transport, storage, distribution, and technical services. This ensures the effective achievement of the event's organizational objectives.

Practical implications: In the management of logistics infrastructure for mass artistic and entertainment events, several good practices have been identified. Effective logistics management for large artistic and entertainment events relies on system integration, flexibility, clear communication with participants, and ongoing activity monitoring. Key trends include leveraging modern technologies in planning and prioritizing sustainability to reduce environmental impact.

Originality/value: This article highlights the importance of managing logistics infrastructure for mass artistic and entertainment events, focusing on maintaining public order, ensuring participant safety, and adapting to changing conditions.

Keywords: mass event, mass gathering, infrastructure, logistic infrastructure, management.

Category of the paper: research paper.

1. Introduction

The logistics infrastructure of mass art and entertainment events forms the backbone of their successful execution, enabling the seamless integration of diverse elements such as crowd accommodation, technical systems, and security measures. These events, characterized by their socio-technical complexity and high public visibility, demand an infrastructure capable of

ensuring participant safety, satisfaction, and environmental sustainability. The critical role of logistics infrastructure lies in its ability to adapt to dynamic conditions, coordinate diverse functions, and support the core objectives of these events (Szymonik, 2011).

The importance of logistics infrastructure is emphasized by the growing scale and complexity associated with contemporary large-scale events. As Getz and Page (2007) argue, infrastructure is a fundamental component of event planning frameworks, while Wincenty-Bosy (2014) highlights its importance in addressing participant needs and ensuring public safety. Environmental considerations further elevate the importance of robust infrastructure, with studies by Cerezo-Esteve et al. (2022), Müller (2015), and Mancini (2023) emphasizing sustainability in large-scale event logistics. Effective infrastructure management, particularly for crowd control and safety, has been explored by Feliciani et al. (2022) and Kanaujiya and Tiwari (2022), who underscore its role in minimizing risks. Johansson et al. (2012) add that public health during mass gatherings is heavily dependent on the quality and resilience of logistical systems. Additionally, Richards and Palmer (2010) explore how event logistics play a strategic role in urban revitalization and cultural management, emphasizing the alignment of logistics with broader societal goals.

Despite these insights, the specific challenges of managing logistics infrastructure for mass art and entertainment events remain underexplored. Such events often involve unique infrastructural requirements, including specialized staging, sound, and lighting systems, alongside innovative security and crowd management solutions.

This article seeks to bridge this gap by exploring the interdisciplinary processes essential for managing logistics infrastructure in mass art and entertainment events. It highlights the importance of aligning infrastructural systems with participant satisfaction, operational efficiency, and compliance, offering insights into optimizing event logistics in a rapidly evolving landscape.

2. Characteristics of mass art and entertainment events

Mass events are a fundamental aspect of human life, significantly contributing to the development and preservation of cultural foundations. They are unique endeavors, enabling the building of social ties, which being part of the cultural heritage, reflect the distinctiveness of a community.

The analysis of historical sources proves that the first recorded ceremonies and celebrations took place more than 60.000 years ago (Berridge, 2020), with the development of civilization, their nature has successively evolved, leading to the development of a modern classification of mass events, taking into account two main criteria: the purpose of their organisation, listing eleven "functions", such as key events connected to the cause, to the audience and to the

participants; and the form, suggesting the existence of twenty-three different forms, including festivals, parades, religious, visual and sports events (Getz, Page, 2007).

According to Getz and Page (2007), a mass artistic and entertainment event is a large-scale, organized gathering designed to showcase artistic, cultural, or entertainment performances and experiences to a broad audience. These events are characterized by their significant scale, involving extensive logistical planning, infrastructure, and coordination to ensure the seamless delivery of unique and memorable experiences. They often serve multiple purposes, including cultural enrichment, community engagement, economic stimulation, and the promotion of artistic expression, while catering to diverse audiences in a shared social setting.

Due to the fact that the entertainment industry is subject to constant modification, adapting to changing market conditions, table 1 distinguishes a number of features of contemporary art and entertainment events.

Table 1.
Features of modern mass art and entertainment events

Item	Characteristics
Diversity of art forms	The bounty of art forms presented at mass events includes music, theater, performance, dance, as well as visual and circus arts. The amount of artistic fields creates unique experiences, contributing to the broadening of society's cultural horizons.
Social integration and educational impact	Mass art and entertainment events act as social catalysts, integrating local communities and attracting participants from diverse backgrounds. These events also seem to impact intellectual development, encouraging participants to reflect on and discuss art, culture or important social issues, fostering integration through the exchange of ideas.
Economic impact	Mass events generate significant economic revenues. In addition to revenue from the sale of tickets, gadgets and other accompanying services, the organisation of such events contributes to the development of local businesses, catering, hospitality and tourism infrastructure, all the while increasing the number of jobs in the market.
Use of technology	Modern mass events use advanced special effects and stage technologies, such as 3D mapping, laser shows, holograms, and drones to create spectacles not only at the stage level, but also over the heads of the audience, representing an innovative approach to shaping the space and atmosphere of the event. The use of VR allows participants to be transported into entirely new virtual worlds, opening up the possibility of interacting with artistic installations or performances in ways that would not be possible in traditional settings. Specially designed mobile apps offer personalized experiences, allowing access to event schedules, a site map or interactive game elements. The use of IoT allows for the creation of smart event spaces, including smart entry gates, exhibit elements or participant tracking, contributing to more efficient event management.
Digital experience sharing	Contemporary mass art and entertainment events, show a close relationship with the emerging digital community. Social media platforms, such as Instagram, Facebook, and Twitter, enable near instantaneous sharing of experiences and visuals, creating a dynamic flow of content, extending the impact of an event beyond its physical boundaries. The development of live streaming allows people outside the event area to remotely participate in the event, resulting in its global accessibility. Through hashtags and dedicated groups on social media platforms, attendees form virtual communities, enabling the exchange of opinions, discussions and the establishment of relationships, while providing a source of feedback for organisers. The digital community is thus not just a documenting, but also an actively shaping force, enriching the experience of mass arts and entertainment events and contributing to their global visibility and relevance.

Cont. table 1.

Emphasis on sustainability and CSR	More and more arts and entertainment events are emphasizing environmental goals, implementing practices such as recycling, reducing plastic consumption and using renewable energy sources, leading to minimizing the event's environmental footprint. The organisers undertake charitable activities, promoting sustainability and engaging in local initiatives. To support the local culture and economy, arts and entertainment events engage regional artists, artisans and suppliers. This contributes to the growth of the local creative and economic sector.
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Source: own elaboration.

The organisation of this type of event entails the need to ensure the comfort and safety of its participants, granted by the availability of infrastructure for supplies, services fulfilling basic needs, maintenance and repair, order and security services, as well as communication, focusing, among other things, on the proper organisation of pedestrian and vehicular traffic and the appropriate deployment of the distribution points network.

3. Logistics infrastructure for mass events

3.1. Universal mass event infrastructure

Logistics infrastructure serves as the essential physical and operational framework for events. Getz and Page (2007) define event infrastructure as encompassing all physical and operational systems necessary to support an event, including venues, transportation networks, utilities, and support services, emphasizing that infrastructure is not merely a logistical convenience but a determinant of an event's feasibility, scale, and impact on its surroundings. Therefore, the logistics infrastructure of mass events is a collection of all kinds of technical means (mobile and stationary) necessary for the proper implementation of tasks related to the planning and supervision of the proper course of such events, with particular emphasis on the security requirements (Kulinska, Rut, Pytel, 2014).

A prominent feature of the logistics infrastructure is its diversity due to the distinctiveness of each event. However, it has been demonstrated that there is a number of relatively constant components, subject only to minor modifications depending on the nature of the event. M. Wincenty-Bosy (2014) distinguished the following components of the logistics infrastructure of mass events:

- stage or show arena (including seats for the audience),
- commercial and gastronomic zone,
- technical and sanitary facilities (utility and social rooms, warehouses, dressing rooms; information and technical support systems, etc.),
- parking lots,
- communications infrastructure,
- communication and evacuation routes,
- organising office.

The primary venue for hosting a mass event is the stage or performance arena, a key component of the service infrastructure that substantially influences the overall audience experience. Kronenburg (2013), providing comfort and safety not only for the audience, but also for those creating the event, such as presenters, singers and actors. The proper location of the stage meeting technical standards provides the audience with the possibility of uninterrupted observation of the events taking place on it, while preventing the intrusion of undesirable persons.

In the opinion of participants, the success of a given event is often significantly influenced by the organisation of the catering area, ensuring the safe preparation and supply of food and water (WHO, 2015), as well as the shopping and entertainment area (Silvers, 2012), which both complement the offer of the mass event. Among the stands located there, potential children's gatherings and alcohol outlets are the most noteworthy. Setting their locations should take into account the requirement for separation of this areas, which is subject to the highest control by the organiser.

Technical and sanitary facilities enable the proper operation and service of the mass event area and its participants, through the provision of social and sanitary and hygienic spaces and equipment. It is also often associated with the need to provide access to maintenance and repair infrastructure, including properly equipped warehouses and the designation of an area to be developed by the machinery park, which is a collection of machinery and equipment that allows the proper progression and security of the event. Sanitary facilities, in turn, guarantee the availability of a number of public toilets, according to the expected attendance, and the ability to dispose of liquid and solid waste generated at the place and time of the mass event (Johansson et al., 2012).

Another element of the logistics infrastructure is the parking lot. There is a requirement for the organiser to designate parking areas when they are not included in the facility plans or to indicate the closest location to them, allowing the audience arriving in vehicles to participate in a given event. Their accurate location is crucial for the proper technical maintenance of events and is an important factor in the perception of a given event by the audience.

Mass events often cause changes in the volume of traffic in the area surrounding the mass event, therefore, its proper adjustment and communication with the city infrastructure, taking into account the location of bus stops and the frequency of public transport is one of the most important infrastructural requirements for the organisation of mass events.

A separate element of the infrastructure are properly marked routes that allow conflict-free and collision-free movement of the people and technical equipment and devices, as well as all kinds of communication and evacuation routes, the course of which is determined bearing in mind the location of medical and information points, thus ensuring adequate safety conditions for all participants of a given event (Struniawski, 2024).

An extremely important role is also played by the organising office, which performs an informational function in relation to a number of stakeholders of the mass event, using a specific communication technique that makes it possible to ensure the fluidity and reliability of the information flow (Nelson, 2008). It is the place for coordinating all the activities carried out at a given event, including the audiovisual recording of its progression. It cooperates with the security coordinator and units and institutions shaping the security system of the mass event, forming part of the infrastructure of law enforcement and security services.

The above elements are an integral part of the logistics infrastructure of mass events, occurring both in the case of artistic and entertainment events, such as music or film festivals, as well as sports events, including football matches. Its other components display a diverse nature determined by the distinctive features of a particular show.

3.2. Logistical infrastructure of an arts and entertainment event based on the example of a concert

Among mass events requiring specific infrastructure, concerts ought to be mentioned, defined as artistic events following a specific musical program which stand in need of the use of appropriate technical equipment (MNE). The parameters of the apparatuses used depend on the individual requirements of the artists, which are stated in the so-called riders, including both technical elements and guidelines related to the equipment of dressing rooms and accompanying elements.

The first part of the document in question contains a detailed description of the artist's requirements relating directly to the dimensions and positioning of the stage; the preferred sound system, including loudspeakers and amplifiers; and lighting, taking into account the specification of the necessary lighting apparatuses and their placement. In addition to the guidelines for the technological solutions used, the technical rider provides information on the so-called backline, which is a graphical presentation of all kinds of musical instruments and equipment, along with a detailed definition of their positions in a way that allows the stage space to be properly arranged. In addition, the document presents a series of guidelines describing the specifications of the monitor system, both individual (in-ear) and stage monitors, used during the concert; and allows the specification of additional preferences relating directly to the equipment, the provision of which is the responsibility of the organiser (Szary, 2014).

While the technical components of the rider revolve around the proper preparation of the venue for the physical realization of the concert, ensuring the proper progression of the show, the dressing room guidelines allow for the proper development of the part of the event facility intended exclusively for artists and staff, taking into account a number of preferences regarding the characteristics and room equipment dedicated to members of the team. In addition, the content of the document often obliges the organiser to provide artists with accommodation of a certain standard and in a preferred location.

The logistical infrastructure of mass events and the technical parameters specified in the riders complement each other, effectively running a given event and shaping the level of satisfaction of its spectators. Organisational practice shows that over time systems are created to support the organisation of mass events, introducing modern solutions not only at the infrastructural level, but relating to the entire process of planning and conducting a specific event.

4. Management of logistics infrastructure of mass art and entertainment events

4.1. Literature review

The management of logistics infrastructure for mass art and entertainment events is an intricate and multifaceted process that forms the backbone of successful event execution. These events, characterized by their large-scale participation and dynamic nature, require seamless integration of planning, coordination, and real-time adaptability. Logistics infrastructure encompasses the physical and operational systems necessary to support all activities related to transportation, storage, distribution, technical maintenance, crowd flow, and safety. The ultimate goal is to ensure the event runs smoothly while prioritizing participant satisfaction, safety, and sustainability. Drawing upon the collective insights of scholars such as Müller (2015), Getz and Page (2007), Cerezo-Esteve et al. (2022), and others, this synthesis explores the critical components and challenges in the management of logistics infrastructure for such events.

A critical initial step in managing logistics infrastructure is the comprehensive analysis of logistical requirements, which forms the foundation for effective planning and execution. This involves identifying the specific requirements of the event, including transportation systems, participant movement patterns, and high-density areas. Accurate assessment is essential to address variables such as crowd flow, the number of attendees, and the physical characteristics of the venue (Müller, 2015; Gong et al., 2020). This includes understanding the dynamics of participant behavior, using tools such as crowd modeling and social data analytics to predict movement patterns and areas prone to congestion (Gong et al., 2020). These insights enable organizers to design efficient layouts that mitigate risks and optimize resource allocation.

Getz and Page (2007) emphasize the long-term implications of infrastructure investments for recurring events, advocating for the integration of infrastructure planning into urban development strategies to ensure that facilities such as roads, parking, and utilities serve both the event and the local community. This perspective underscores the dual purpose of permanent infrastructure, which facilitates event operations while providing lasting benefits to host cities.

In contrast, Kanaujiya and Tiwari (2022), in their study of the Kumbh Mela, focus on the deployment of temporary infrastructure, such as tent cities and short-term bridges, to accommodate millions of participants in a time-bound setting. While temporary infrastructure allows for flexibility and scalability to meet specific event demands, it lacks the permanence and broader community utility emphasized by Getz and Page. These differing approaches reveal the varied infrastructural needs of mass events, highlighting the importance of tailoring solutions to event-specific contexts. Whether permanent or temporary, both models underline the necessity of meticulous planning, coordination, and adaptability to ensure safety and operational efficiency.

The infrastructure supporting mass events must cater to several layers of participant needs, from functional and logistical to experiential and emotional. Space planning plays a pivotal role in ensuring the smooth operation of these events. Strategic zoning is necessary to identify and designate areas for entrances, exits, recreational zones, food service areas, main performance stages, and medical facilities (NAS Nik Him et al., 2018). Effective spatial design ensures that participants can move seamlessly between different areas while minimizing bottlenecks (Struniawski, 2024). Clearly marked routes, efficient signage, and designated pathways for both pedestrians and vehicles are crucial components of this process (Johansson et al., 2012). In large-scale gatherings, spatial layouts also serve aesthetic and experiential purposes, particularly in artistic and entertainment events where ambiance contributes significantly to participant satisfaction (Getz, Page, 2007). These elements, combined with well-organized seating arrangements, viewing zones, and accessibility features, enhance the overall experience and ensure that the infrastructure meets the diverse needs of attendees.

Transportation infrastructure is another cornerstone of logistics management. Events of significant scale require detailed planning of transportation routes, parking facilities, public transit systems, and pedestrian pathways to ensure efficient and safe access to the venue. Transportation planning also extends to the movement of technical equipment, supplies, and staff to and from the event site. Effective coordination between event organizers, municipal authorities, and transport providers is essential to avoid congestion and ensure the timely arrival of resources (Kanaujiya, Tiwari, 2022). Large events often necessitate temporary adjustments to existing transport systems, such as rerouting public transit, providing shuttle services, and creating dedicated access routes for vehicles. Additionally, the increasing focus on sustainability in logistics planning calls for eco-friendly transportation solutions, such as low-emission vehicles, bicycle parking stations, and walkable access points to reduce the environmental footprint of events (Cerezo-Esteve et al., 2022; Ballarano et al., 2022).

Safety and emergency management are integral to the logistics infrastructure of mass events. The scale and density of participants in these events create potential risks, necessitating robust safety protocols and real-time monitoring systems. Evacuation planning is a fundamental aspect of safety management, requiring detailed maps of exit routes, assembly points, and crowd control mechanisms (Marsella, Sciarretta, 2018). Emergency services, including

medical teams, fire departments, and law enforcement, must be strategically deployed to address incidents swiftly and effectively. Surveillance systems, such as CCTV and drone monitoring, are increasingly used to observe crowd behavior and identify risks in real time (Silvers, 2012). The integration of predictive tools, such as scenario modeling and risk assessment software, enhances the ability of organizers to anticipate and mitigate emergencies. For instance, these tools can simulate crowd movements and predict areas of potential congestion, enabling preemptive action to prevent accidents (Patel et al., 2016).

The logistical demands of real-time operations during mass events are equally critical. Dynamic distribution of materials, such as food, merchandise, and supplies, requires sophisticated inventory management systems to ensure availability at all points of need. Distribution hubs must be strategically located within the event site to minimize delays and disruptions (Silvers, O'Toole, 2020). This is particularly important for catering and retail operations, where participant satisfaction depends on quick and efficient service. Additionally, real-time logistical adjustments may be required to address unforeseen challenges, such as supply shortages or equipment malfunctions. Advanced technologies, including real-time tracking systems and mobile communication networks, facilitate efficient management of resources and coordination among teams (Gong et al., 2020).

Environmental sustainability is an emerging priority in the logistics management of mass art and entertainment events. These events often generate significant waste, consume large amounts of energy, and place substantial demands on local infrastructure. Sustainable practices, such as renewable energy integration, waste management systems, and eco-friendly materials, are increasingly being adopted to minimize environmental impact (Cerezo-Esteve et al., 2022; Mancini, 2023). Organizers are also encouraged to promote sustainable behaviors among participants, such as using public transit, recycling, and reducing single-use plastics. Sustainable logistics not only align with global environmental goals but also enhance the reputation of events and attract environmentally conscious audiences (Getz, Page, 2007).

The role of technology in logistics infrastructure management cannot be overstated. Emerging technologies, such as artificial intelligence (AI), the Internet of Things (IoT), and big data analytics, are transforming the way logistics are planned and executed (Gong et al., 2020). AI-powered tools enable organizers to analyze large datasets, optimize resource allocation, and predict potential disruptions. IoT devices, such as sensors and wearable technology, provide real-time data on crowd density, environmental conditions, and equipment status. Social media analytics offer insights into participant sentiment and behavior, enabling organizers to make informed decisions during the event (Silvers, 2012). These technological advancements are reshaping the landscape of logistics infrastructure management, making it more efficient, adaptable, and responsive to the needs of modern events.

The coordination and collaboration among stakeholders represent another essential aspect of logistics infrastructure management. Successful events require seamless coordination between organizers, venue operators, local authorities, transportation agencies, and emergency

services. Stakeholder mapping and integrated planning committees facilitate communication and alignment of objectives among all parties involved (Getz, Page, 2007). This collaborative approach ensures that logistical systems are robust and capable of addressing the diverse challenges posed by mass events. It also fosters a sense of shared responsibility, enhancing the overall efficiency and resilience of the event infrastructure.

In conclusion, the management of logistics infrastructure for mass art and entertainment events is a complex but indispensable aspect of event planning. It integrates multiple components, including pre-event analysis, space planning, transportation, safety, real-time operations, and sustainability. The collective insights from scientific studies underline the importance of holistic planning, technological innovation, and stakeholder collaboration in achieving successful outcomes. As mass events continue to grow in scale and complexity, the adoption of advanced practices and sustainable solutions will become increasingly critical. By addressing these challenges proactively, event organizers can create infrastructure systems that are not only efficient and safe but also aligned with the evolving expectations of participants and the broader goals of sustainability and social responsibility.

4.2. Own research

The management of logistics infrastructure for mass events is a comprehensive process, involving the planning, coordination and control of all activities related to transportation, storage, distribution and technical maintenance, determining of the success of the show. It is a multi-stage, complex process, requiring the coordination of a number of activities at each stage of organising a given event, from the development of the initial plan to the ultimate completion of the event.

The first step, carried out as part of the management of logistics infrastructure for mass events, is therefore a thorough analysis of the event's logistical needs (Müller, 2015), which includes, among other things, planning the direction of participants' movement, taking into account safety issues and the possible population flow, includes the identification of the main entry and exit points, movement routes of participants, and areas characterized by the highest population density during the event (Gong et al., 2020). The analysis also takes into account the needs for transportation of necessary materials, technical equipment, or catering supplies. This requires identifying available transportation means, transportation routes, and delivery schedules. Transported materials sometimes undergo warehousing processes, forcing the need for adequate storage space, storage conditions, and ways to organise and manage inventory. A key aspect then is to ensure the safety and security of supplies, with the goal of protecting them from theft, pests, weather conditions and fire hazards (Getz, Page, 2007). In addition, an analysis of the logistical needs of mass events is followed by recognizing a number of requirements for catering and sanitary facilities and technical services, including sound systems, lighting, monitoring systems and audiovisual equipment, while taking into account the needs of technical personnel and the availability of necessary external services.

The aforementioned activities show a direct connection to the next stage of logistics infrastructure management for mass events, centered around space planning (NAS Nik Him et. al., 2018), in a way that allows for the smooth flow of people and goods, involving the identification of key areas such as the entrance and exit area, recreational and food service areas, the main stage, and sanitary and medical facilities. The challenge for organisers is constantly to arrange the aforementioned areas in such a way as to ensure the smooth flow of participants between the various zones of a mass event (Getz, Page, 2007). These movements take place on the basis of specific routes, suitable for both pedestrian and vehicular traffic. The provision of clearly marked routes and appropriate road signs is key to guaranteeing the safety of event participants. This safety is also granted by the presence of evacuation zones, access to fire extinguishers and first aid kits, as well as emergency service patrols, whose posts are deployed based on estimated movements and areas with the highest population density. As part of space planning, it is also necessary to properly deploy technical infrastructure, such as sound systems, lighting, and monitoring systems.

The management of logistics infrastructure for mass events also takes into account a number of measures to guarantee the area's transportation accessibility by analyzing the facilities prepared for participants, such as public transportation, parking lots (including parking spaces designated for the disabled), bicycle stations, or dedicated transportation lines to get to the event site. Transportation planning also includes designing transportation routes, based on the event's location, road accessibility and expected peak traffic hours, to ensure the smooth flow of vehicles and minimize traffic congestion (Kanaujiya, Tiwari, 2022), as well as coordinating the delivery of materials and technical equipment well in advance, allowing the facility to be prepared for a mass event.

The activities carried out as part of the management of the logistics infrastructure of mass events also include a set of activities aimed at the distribution of materials, taking place, often in real time, in a number of distribution points (used for catering, sales, or information) located in strategic parts of the facility (Silvers, O'Toole, 2020; Silvers, 2012). The efficiency of resource allocation during a mass event depends on effective inventory management, which limits stock fluctuations at specific points of the distribution network. This involves planning supplies based on estimated demand, which in turn is based on population density in different parts of the facility.

Infrastructural issues are also addressed when preparing an evacuation plan, identifying potential risks related to the logistics of the mass event (including technical failures and transportation inconveniences), enabling the establishment of evacuation routes, assembly points, and procedures related to crowd control (Marsella, Sciarretta, 2018). Indeed, the protection of life, health, and property of the participants, employees, and all persons associated with a mass event, implemented through, among other things, monitoring and responding to potential threats, plays a fundamental role during mass events. These activities require the cooperation of many teams, involving the logistics team, emergency services, police,

medical personnel, technical service providers and other entities responsible for the safety and comfort of event participants. This cooperation enables the coordination of a range of activities in real time, while maintaining a high degree of flexibility manifested in a readiness to adapt to changing environmental conditions.

The management of the logistics infrastructure for mass events is a key element in the organisation and conduct of such events, requiring a precise analysis of logistical needs, space planning, coordination of activities of various teams, and continuous monitoring and response to changing conditions. With the proper management of the logistics infrastructure of mass events, it is possible to ensure the safety, comfort and satisfaction of participants and the effective achievement of the organisational goals of the event.

5. Discussion

The management of logistics infrastructure for mass art and entertainment events is an intricate process, drawing on both theoretical insights and practical applications. A detailed comparison of the literature review and original research reveals areas of convergence in foundational practices but also significant differences in the depth and breadth of their focus. These differences highlight gaps, emerging priorities, and the diversity of approaches to logistics infrastructure management across contexts.

Both the literature and the original research emphasize the importance of pre-event planning as the cornerstone of effective logistics management. The original research highlights logistical needs assessment, focusing on participant movement, transportation of materials, and the identification of high-density areas as critical components. Similarly, Müller (2015) and Gong et al. (2020) stress the significance of mapping crowd flow patterns and anticipating potential bottlenecks. However, while the original research concentrates on immediate logistical needs, the literature extends this perspective by incorporating predictive tools and data analytics to simulate crowd behavior and plan for dynamic conditions (Gong et al., 2020). This distinction underscores a methodological difference: the original research provides practical, on-ground strategies, whereas the literature emphasizes the integration of advanced technologies for forecasting and adaptability.

A striking difference emerges in the discussion of infrastructure longevity. The original research predominantly addresses short-term logistical requirements, such as temporary routes, storage, and warehousing, to meet the immediate needs of a single event. In contrast, Getz and Page (2007) advocate for a long-term view, emphasizing the integration of infrastructure planning into urban development strategies. Permanent infrastructure, they argue, serves not only the event but also the local community, creating lasting benefits. This long-term perspective is notably absent in the original research, which focuses on event-specific solutions.

Conversely, the study by Kanaujiya and Tiwari (2022) on the Kumbh Mela complements the original research by showcasing the scalability and adaptability of temporary infrastructure, such as tent cities and short-term bridges, to accommodate large crowds. This divergence between permanent and temporary infrastructure highlights the varied demands of different event contexts, where flexibility and permanence offer distinct advantages.

Space planning is a shared focus in both the literature and the original research, but their approaches diverge significantly. The original research emphasizes practical spatial zoning, such as identifying areas for entrances, exits, and essential services, and ensuring smooth participant flow. This aligns with the work of NAS Nik Him et al. (2018), who stress the importance of minimizing congestion through clear zoning and designated pathways. However, the literature, particularly Getz and Page (2007), extends the discussion to include the aesthetic and experiential dimensions of space planning, especially for artistic events where ambiance plays a pivotal role in participant satisfaction. While the original research provides a functional blueprint for space design, the literature's broader perspective suggests that logistics infrastructure can contribute not only to operational efficiency but also to the overall participant experience, a dimension underexplored in the original findings.

Transportation planning is another area of significant difference. Both the literature and the original research agree on the importance of efficient transportation routes, public transit integration, and parking facilities. However, while the original research focuses on coordinating deliveries and managing traffic flow, the literature adds a layer of sustainability. Cerezo-Esteve et al. (2022) and Ballarano et al. (2022) emphasize the adoption of eco-friendly transportation solutions, such as low-emission vehicles and bicycle parking stations, to reduce the environmental footprint of events. This sustainability perspective is largely absent in the original research, which prioritizes operational efficiency over environmental considerations. The literature's focus on sustainability reflects a growing global priority that event organizers must increasingly address to align with broader environmental goals and participant expectations.

Safety and emergency management are critical areas where the literature and original research converge but with varying degrees of depth. The original research emphasizes evacuation planning, deployment of emergency services, and the use of monitoring systems to manage risks during events. These findings align with the work of Marsella and Sciarretta (2018) and Patel et al. (2016), who highlight the importance of risk assessment and scenario modeling. However, the literature further explores advanced safety technologies, such as predictive analytics, drone surveillance, and wearable devices, which are absent from the original research. These tools provide real-time data and improve emergency preparedness, offering a proactive approach to safety management that is underrepresented in the practical strategies of the original findings.

The role of technology in logistics infrastructure management illustrates a significant divergence. While the original research acknowledges the use of monitoring systems, it does not delve into the transformative potential of emerging technologies. In contrast, the literature emphasizes the integration of artificial intelligence (AI), the Internet of Things (IoT), and big data analytics in optimizing logistics processes. Gong et al. (2020) demonstrate how social media analytics can provide real-time insights into crowd behavior, enabling dynamic adjustments to logistical plans. Silvers (2012) also highlights the potential of IoT devices for tracking resources and monitoring environmental conditions. This technological dimension, which significantly enhances adaptability and efficiency, remains a largely untapped area in the original research, pointing to an opportunity for further development.

Environmental sustainability is another domain where the literature offers insights that are less prominent in the original research. While the original findings focus on logistical efficiency, the literature places increasing emphasis on sustainable practices, such as renewable energy integration, waste reduction, and participant engagement in eco-friendly behaviors (Cerezo-Esteve et al., 2022). Getz and Page (2007) advocate for a “triple bottom line” approach, balancing economic, social, and environmental considerations in logistics management. The absence of sustainability as a core component in the original research reflects a gap that must be addressed to align with contemporary expectations and environmental imperatives.

Collaboration among stakeholders is a shared priority but is treated differently in the literature and original research. The original findings highlight the need for coordination among logistics teams, emergency services, and technical personnel, emphasizing real-time cooperation to address challenges. However, the literature provides a more structured approach to stakeholder collaboration, advocating for integrated planning committees, stakeholder mapping, and transparent communication frameworks (Getz, Page, 2007). This broader perspective ensures that diverse priorities are harmonized, contributing to the resilience and efficiency of logistical systems. The original research, while practical, lacks this strategic emphasis on stakeholder alignment.

In conclusion, the management of logistics infrastructure for mass art and entertainment events is a complex and evolving field. The literature and original research share a foundation of core practices, such as thorough planning, space design, transportation management, and safety measures. However, significant differences emerge in their emphasis on sustainability, technology, long-term infrastructure planning, and experiential dimensions. The literature offers a forward-looking perspective, integrating advanced tools, environmental considerations, and strategic stakeholder collaboration, while the original research provides grounded, event-specific strategies. Bridging these approaches can lead to a more comprehensive and effective framework for logistics infrastructure management, ensuring both operational success and alignment with global trends and expectations.

6. Conclusion

Mass events have become an essential element of contemporary social life, exerting a profound influence on various domains, including culture, tourism, and urban promotion. These gatherings not only foster cultural exchange and collective identity but also serve as catalysts for attracting visitors, boosting local economies, and enhancing the global visibility of cities. By showcasing unique cultural offerings and infrastructure, such events contribute to the development of a city's brand and reputation on the international stage. Noticeable economic and educational impact, as well as support of social integration processes are just some of the features that make these events known as incubators of artistic, technological and social transformations. The changes are also visible in the area of logistical infrastructure, which is subject to processes of transformation, shaped by the preferences of artists and the need to meet the growing demands of participants of such events.

The analysis presented is a source of valuable guidance for mass event organisers. A summary of key findings relevant from the perspective of logistics infrastructure management is presented in table 2.

Table 2.

Suggestions for organisers of mass events - logistics infrastructure management

“Good practice”	Description
Modern technology integration	Leverage advanced technologies such as AI, IoT, and big data analytics to optimize logistical operations. Use mobile apps to provide real-time updates on schedules and navigation while monitoring crowd density and adjusting resource allocation dynamically (Gong et al., 2020; Silvers, 2012).
Efficient space planning	Strategically zone key areas such as entrances, exits, food service zones, and medical facilities to ensure smooth participant flow and minimize congestion. Integrate aesthetically pleasing green zones to enhance participant satisfaction and environmental integration (NAS Nik Him et al., 2018; Getz, Page, 2007).
Transportation logistics	Plan transportation systems to align with event schedules, ensuring accessibility and reduced congestion. Collaborate with local authorities on public transit options, encourage carpooling through incentives, and provide electric vehicle charging stations (Cerezo-Esteve et al., 2022; Ballarano et al. 2022).
Flexibility and adaptability	Prepare for dynamic challenges by implementing modular infrastructure designs and backup systems. Create alternative transportation routes and contingency plans to address potential disruptions such as weather changes or technical failures (Feliciani et al., 2022).
Stakeholder Collaboration	Establish integrated planning committees to facilitate communication and coordination among event organizers, local authorities, transport agencies, and emergency services. Pre-event workshops and stakeholder mapping align priorities and resolve potential conflicts (Getz, Page, 2007).
Participant communication	Enhance participant experience by using mobile applications and on-site staff to provide real-time information on schedules, navigation routes, and emergency protocols. This improves clarity and ensures participants feel informed and supported (Woźniak, 2017).
Continuous monitoring and evaluation	Conduct thorough post-event analyses of logistical efficiency, participant behavior, and resource usage to refine future event planning. Collect feedback from attendees to better understand their expectations and improve subsequent events (Patel et al., 2016).
Sustainable planning	Adopt environmentally conscious practices to minimize the ecological footprint of events. Promote public transportation, carpooling, and bike parking to reduce CO2 emissions. Integrate renewable energy solutions and implement robust waste management systems, including recycling and composting (Cerezo-Esteve et al., 2022).

Source: own elaboration.

In conclusion, the adoption of best practices such as sustainable planning, the integration of advanced technologies, efficient spatial design, adaptable logistical strategies, effective stakeholder collaboration, proactive participant communication, and ongoing evaluation is essential for the successful execution of mass events. These practices not only enhance logistical efficiency and operational effectiveness but also address the growing environmental and societal expectations placed on event organizers. By embracing these approaches, organizers can establish new benchmarks for excellence in managing large-scale art, cultural, and entertainment events, fostering innovation while promoting sustainability and inclusivity.

Acknowledgements

The publication was co-financed/financed from the subsidy granted to the Cracow University of Economics - Project nr 77/ZZO/2023/PRO.

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