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„Sport must be the heritage of all men and of all social classes “

Pierre de Coubertin

All the articles listed have been subjected to peer review.

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Case Study

Social responsibility in sport: A case study of CSM Bucharest

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Abstract: This article addresses the issue of corporate social responsibility (CSR) in sport, focusing on the role of sport organizations as agents of positive social change. The aim is to analyze how systematic work with youth, collaboration with public institutions and community-oriented activities can contribute to building trust, reputation and long-term impact of sports clubs. The research is based on a qualitative content analysis of a structured interview with a representative of a major metropolitan multi-sport club. The results highlight the organization's strong links with the community, its emphasis on youth development and the application of CSR through multiple forms - from collaborations with the not-for-profit sector to educational initiatives. The article also reflects on the limitations of applying CSR in the context of strategic planning and makes recommendations for further research and practice in sport management.

Keywords: social responsibility, CSR in sport, sports management urban sports clubs

1. INTRODUCTION

Social responsibility, CSR in sport, sport management urban sports club Sport managers must decide what is the right thing to do and consider their actions in a broader societal sense without a handbook to guide them [1]. According to DeSensi and Rosenberg, the recognition of ethics and social responsibility has increased in recent years. It is paramount for a sport manager to learn to adopt a social consciousness leading to a commitment to being socially responsible, with the topics being mainly related to the nature of the complex relationship between society and sport or issues of the formal organization of sport [2].

Without academically defining these activities, many sports organizations have for years been involved in what is now termed Corporate Social Responsibility (CSR). Over the last 40 years, CSR has gradually become a key management trend, with companies now expected to espouse this business philosophy through a range of activities [3].

There are four main arguments [4] [5] to justify the application of CSR approaches: moral obligation, sustainability, operational license, and reputation. According to Husted, foundations, in-house projects and collaboration can be considered as the three main ways of implementation. Foundations consist of charitable contributions (financial or other resources) to independent organizations that further distribute them to the community. There is an independent relationship between donors and recipients, and the advantage for the organizations involved is mainly the minimal involvement in project management compared to the overall results. For in-house projects, companies allocate resources to programs developed within the company. The donor and the recipient therefore fall under the same organization. While the cost of such projects can be significant, the greatest advantage is that managers can strategically focus resources to meet specific organizational and community needs. Collaboration is the sharing of resources and costs, as well as the enjoyment of benefits in a partnership between a company and a nonprofit sector organization [6].

Given the specifics of the industry, Salcines et al. have defined six pillars of social responsibility in sport. These pillars reflect the complexity and range of activities that sport organizations can incorporate into their social responsibility initiatives: labor relations, environmental management and sustainability, community relations, philanthropy, diversity and corporate governance [3].

Sport can play two roles in the corporate social responsibility process. It can be an actor in the implementation of CSR or a process through which sporting and non-sporting organizations address social and environmental issues [7] [8]. Through these platforms, some argue that CSR in sport can have a significant impact on certain issues such as education, health and social engagement [9]. Therefore, it is imperative for sports organizations to participate in CSR and even be leaders in it [10] [9] [11].

In conjunction with sport, CSR has a significant impact on brand reputation, engagement and loyalty, all of which ultimately and directly influence the mission of sport organizations. The notion of a 'dual mission' pushes the boundaries of what should be the mission of sport organizations (particularly from the top tier of the not-for-profit and commercial sectors). It doesn't have to be just about results or growing revenue, but also about making a tangible and lasting positive impact on their community [12][13].

2. MATERIALS AND METHODS

The aim of this article is to explore how sports organizations can effectively contribute to community development, strengthen social ties and build their credibility and long-term impact beyond the sports field through socially responsible activities, systematic work with youth and collaboration with public institutions.

The main research method was sociological inquiry using a structured interview technique [14]. The respondent was the general manager of CSM Bucharest. This was the manager of the basketball section, as the club is multi-sports and the separate components have their own managers depending on the sport. The interview was conducted in March 2019, through the social network WhatsApp and it was about answering predefined questions through voice messages. It lasted 45 minutes. Topics of conversation included socially responsible activities and the club's connection with the community, systematic youth development and cooperation with schools, stakeholder relations, support from the city, strategic partnerships with public institutions and the overall importance and position of CSM Bucharest within Romanian sport. Qualitative content analysis was used to analyze the data [15]. The interview was read several times and then the key findings for the analyzed area were extracted. The findings were not quoted or paraphrased but directly incorporated in the text of the thesis, referring to the fact that this is information from the interview.

3. RESULTS

From the structured interview it is possible to define six basic headings of findings from the perspective of the CSR concept and then to organize them. This ordering reflects prioritization according to long-term impact on the community, youth and sustainable relationships, with historical achievements and brand being considered as a fundamental but less dynamic factor:

1. Strong links with the community and CSR activities
2. Youth development and cooperation with schools
3. Relations with stakeholders
4. Support and cooperation with the city
5. Strategic partnership with the city and schools
6. The importance of the club and its position in Romania

The interview results show that CSM Bucharest pays particular attention to building a relationship with the community through a wide range of CSR activities. The club is actively involved in socially beneficial activities, organizing free sports camps and workshops for children and young people, often led by experts in the field of sports science and nutrition. Support for charitable projects and cooperation with the non-profit sector is also important.

An interesting example is the innovative "Reading Stands Tall" initiative, which not only promoted reading among children but also built a symbolic community identity. Fans brought books to games to create a 3.05 m tall pole, the height of a basketball hoop. As a result, more than 10,000 books were donated to schools, hospitals and libraries. Such activities underline the club's vision as an active player in the community and reinforce its positive image.

A key pillar of the club's activities is systematic work with young people and links with schools. Approximately 1200 children are involved in CSM's youth program. The club maintains partnership relations with schools, providing them not only with sports equipment, but also with professional support in the form of coach training and educational programs.

The Centre of Excellence created by the club provides comprehensive facilities, from nutritional counselling and psychological support to scholarships for talented athletes. An important outcome of this strategy is the regular transition of players from the youth categories to the senior A and B teams, thus creating a continuous and sustainable career progression.

CSM Bucharest is aware of the expectations that the public and the sponsors have of it. Therefore, it does not only try to act as a sports team, but as a carrier of values and visions related to sport, education and social inclusion. It offers sponsors more than just advertising space - it provides the opportunity to participate in socially responsible initiatives, thereby increasing their social legitimacy.

An important part of the relationship with the community is the established system of communication with the fans, who are actively involved in various events and decisions. Such an approach builds trust and loyalty to the club's brand and supports its long-term position in society.

The City of Bucharest plays an important role in the day-to-day running of the club. It provides an annual financial subsidy of approximately EUR 900 000. This support covers the activities of the senior team, the youth teams as well as marketing activities. The funding is primarily directed towards well-defined projects that have added value to the community.

However, despite this support, the club faces infrastructure challenges. It often must play its home matches at the ground of rival club Dinamo Bucharest, which reduces its autonomy and comfort. This is an area where cooperation between the club and the city could be improved by investing in its own sports facilities.

The club's relationship with municipal and educational institutions can be described as strategic. The club is actively involved in city projects aimed at the community, with its initiatives contributing to building a positive image of the city. Representatives of the club regularly communicate with local authorities, present their activities and participate in decision-making processes.

Cooperation with schools goes beyond sport. Players and coaches are also involved in teaching physical education; the club monitors the academic performance of young athletes and provides support where needed. This integration creates a synergy between education and sport and fulfils the “student athlete” philosophy that the club systematically promotes.

CSM Bucharest is historically one of the most important sports brands in Romania. With several domestic titles and successes at international level (e.g. Eurocup or FIBA Europe Cup), it has built a strong name and respect. Its status as a multi-sport club managed by the city underlines its community anchorage and stability.

Despite the strong brand, however, the club places emphasis not only on past achievements, but more importantly on the future built through community involvement, youth education and partnership.

The main idea of the interview is that “Stakeholders need to understand that every euro invested in sport is worth five euros invested somewhere else.”

4. DISCUSSION

The results of the research, which was conducted through a structured interview with the general manager of CSM Bucharest, confirm the importance and growing trend of corporate social responsibility (CSR) in the field of sport as described by DeSensi and Rosenberg or Salcines et al. In the case of the CSM Bucharest multi-sport club, it is possible to identify several activities that correspond to the theoretical pillars of CSR - especially in community relations, philanthropy, education and the internal organization of the club [2] [3].

From a theoretical point of view, foundations, in-house projects and collaboration are the main ways of implementing CSR [6]. The results show that CSM Bucharest uses these forms. E.g. through cooperation with charities, schools, or own community projects. An important feature is the linking of sport activities with education, which goes in line with the concept of the “double mission” [12], which emphasizes not only sport performance but also the long-term positive social impact.

Common features between theory and practice include an emphasis on the community dimension. CSM Bucharest actively seeks to act as a social actor in the local community, implementing activities to improve the social inclusion of children and young people, promoting their education and improving conditions for sports. For example, the book collection project in the basketball component fulfils both philanthropic and environmental sustainability aspects (secondary use of books), while at the same time building the club's brand image through partner involvement and community participation.

However, differences can be seen particularly in systematic and strategic CSR planning. Theoretical frameworks often assume a comprehensive integration of CSR into the strategic management of the organization, whereas in the case of CSM Bucharest it is mostly a series of stand-

alone projects and initiatives that may not be explicitly part of a formal strategic framework. Nevertheless, the results show that even such an approach can have a tangible positive impact on the community and brand perception.

Another key finding is that CSM Bucharest actively promotes values such as education, equal opportunities and healthy lifestyles, thereby seeking to reinforce the social relevance of sport. Also important is the emphasis on the concept of the 'student athlete, which links the performance of sport with academic achievement and promotes the holistic development of young people.

It can be concluded that CSM Bucharest represents an example of a sports organization that effectively applies the philosophy of social responsibility in line with theoretical concepts, albeit with some practical specificities and deviations that are influenced by the cultural-institutional context.

5. CONCLUSION

The research confirmed that CSM Bucharest represents a relevant example of a sports organization that actively applies the principles of social responsibility in line with the theoretical underpinnings and concepts of CSR, placing particular emphasis on community, education and philanthropy, thus promoting the social dimension of sport in an urban environment.

The main limitation of the research is its qualitative nature based on one structured interview with a club representative, which may affect the degree of objectivity and generalizability of the results. It lacks the perspective of other stakeholders such as fans, players, sponsors or city officials, which could provide a more comprehensive picture of the perception of the club's CSR activities.

In the future, it would be useful to conduct extended research involving more sports clubs in Romania or in the CEE region, or to compare municipal and private sports clubs. In addition, more emphasis could be placed on measuring the impact of CSR activities on the community, brand perception and long-term sustainability of these initiatives.

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Article

Wearable Fitness Technology Reshaping Public Health

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Abstract: Wearable technologies are playing an increasingly pivotal role in transforming public health by empowering individuals to take control of their wellness. These devices, including smartwatches, heart rate monitors, sleep trackers, and AI-powered fitness bands, are transforming the way people approach their physical and mental well-being. This article examines the broader health benefits of the widespread adoption of wearable fitness technology, with a specific focus on recovery tracking, injury prevention, and sleep monitoring. Through a qualitative review of secondary literature and academic sources, the study identifies how wearables enhance preventive care by enabling users to monitor key biometric indicators, receive personalized feedback, and adjust their daily behaviors accordingly. The findings suggest that wearables support a shift from reactive healthcare models to proactive, user-driven health management strategies. However, the adoption and sustained use of these technologies face several barriers, including concerns about data accuracy, a decline in user engagement, data privacy risks, and unequal access due to cost and digital literacy gaps. These challenges must be addressed through targeted design improvements, policy support, and education. This paper concludes that when integrated equitably and responsibly, wearable technology has the potential not only as a useful sports technology tool but be transformative in advancing public health and promoting long-term well-being across diverse populations.

Keywords: Sports Technology; Wearable Technology; Public Health

1. INTRODUCTION

Sports technology refers to innovations that enhance human physical performance and experience in athletic and recreational settings. That includes equipment designed to measure and optimize body function, such as advanced training tools, biomechanical feedback systems, and performance analytics platforms. These technologies have traditionally been used in professional sports environments to boost athlete outcomes through precision tracking and data analysis [2]. Over time, these tools have evolved and found applications in consumer health and fitness, resulting in increased awareness and participation in performance-oriented training [1].

In recent years, the intersection of sports technology and public health has become increasingly prominent. Technological innovations once reserved for elite professional athletes are now widely accessible to the public [1,2]. Wearable fitness devices, including GPS trackers, heart rate monitors, sleep sensors, and artificial intelligence-enabled fitness bands, have experienced exponential growth in both development and usage. These tools allow users to access real-time health data, facilitating informed decision-making and proactive health management [3].

The rise in lifestyle-related diseases and sedentary behavior has highlighted the urgent need for preventive health solutions. Wearable technology offers a means for continuous health monitoring, facilitating the early detection of anomalies, enhancing adherence to physical activity, and promoting better sleep and recovery practices [4,5]. The incorporation of these technologies into daily routines signifies a paradigm shift from traditional, reactive healthcare models to more proactive, self-managed wellness strategies. As such, these tools hold transformative potential in promoting healthier lifestyles and reducing healthcare burdens across diverse populations [6].

This article aims to examine how wearable fitness technologies are reshaping public health through their applications in recovery tracking, injury prevention, and sleep monitoring and to assess their implications for preventive care and health management.

This article aims to examine how wearable fitness technologies are reshaping public health through their applications in recovery tracking, injury prevention, and sleep monitoring and to assess their implications for preventive care and health management.

2. MATERIALS AND METHODS

This paper utilizes a qualitative content analysis of secondary sources, including recent academic research and industry reports on wearable technologies. The Snowball technique was applied to identify key literature, focusing on studies published after 2023. A comparative analysis was conducted to assess which technologies have successfully transitioned to general consumer use and which remain exclusive to elite sports due to cost or complexity. The focus was on three core functions of wearable devices: recovery tracking, injury prevention, and sleep monitoring.

3. RESULTS

Wearable technologies are equipped with sensors that collect biometric data, including heart rate, respiration, movement patterns, and sleep cycles [1]. These devices represent a convergence of health science, engineering, and behavioral psychology [6]. The theoretical foundation for their use lies in behavior change models, which posit that timely feedback and personal data increase awareness and motivate healthier choices [7].

Devices like WHOOP and Polar H9 exemplify this integration by providing continuous feedback to optimize performance, prevent injury, and support recovery [8]. Their success also hinges on user-friendly interfaces, mobile app integration, and personalized recommendations, which enable users to interpret complex health metrics [9].

The diffusion of innovations theory is especially relevant in understanding the proliferation of wearable technologies. Adoption is driven by perceived usefulness, affordability, ease of use, and visibility. As wearable devices become more intuitive and affordable, they attract a broader demographic, including users focused on general wellness rather than athletic performance [7]. Nevertheless, adoption is uneven across populations, with digital literacy and socioeconomic status acting as critical barriers [4]. Artificial intelligence incorporated into wearable devices also enhances personalization and motivation [6].

Devices like WHOOP and Polar H9 enable users to monitor recovery through metrics such as heart rate variability, resting heart rate, and respiratory rate [1,9]. These metrics help individuals understand how their body responds to physical strain, allowing for tailored training and rest cycles. WHOOP, initially designed for professionals, now supports users across demographics by offering accessible subscription models. By promoting adequate recovery, wearables can reduce overtraining and stress-related injuries, aligning with preventive care goals.

Wearables also contribute significantly to injury prevention by capturing biomechanical and physiological data. Devices equipped with GPS and motion sensors detect movement inefficiencies and fatigue indicators [8]. This information allows early intervention before injuries manifest. Smart insoles and posture sensors, initially designed for professional physiotherapy, are now being adopted by fitness enthusiasts to correct their form and prevent strain [10]. Heart rate monitors alert users to signs of overexertion, further mitigating injury risk [2].

Sleep quality is a critical determinant of physical and mental health. Fitness trackers equipped with sleep sensors provide users with data on sleep duration, cycles, and efficiency [5]. These insights empower users to adjust lifestyle factors that impact sleep, such as exercise timing, screen exposure, and stress levels. Improving sleep hygiene using self-monitoring tools enhances overall well-being and supports the prevention of chronic diseases.

The integration of wearables into public health strategies can address population-level concerns. For example, wearables encourage regular activity, contributing to the reduction of cardiovascular risks and metabolic disorders [3]. AI-driven feedback further personalized user experience, increasing adherence and long-term engagement [6]. However, challenges remain. Data privacy and security are significant barriers, with many users unaware of how their biometric data is stored or used [11]. Additionally, cost and digital literacy influence adoption, particularly in economically disadvantaged regions [4].

While wearable fitness technologies offer numerous health benefits, they are not without limitations. One significant issue is data accuracy; measurements of sleep stages or caloric expenditure can vary between devices and sometimes differ from those of clinically validated instruments. Inconsistencies in algorithm performance may lead to misleading interpretations, which can impact user trust and decision-making [5].

Another limitation is user fatigue or dropout. Sustained engagement with wearable technology often declines over time, particularly if users feel overwhelmed by data or do not perceive meaningful insights. Without practical interpretation and contextualization, users may struggle to convert data into actionable lifestyle changes [4].

Privacy and data ownership also pose critical concerns. Users often have limited awareness or control over how their personal health information is used, stored, or shared by device manufacturers or third-party platforms [11]. Regulatory frameworks are still evolving to protect users, especially in non-clinical health settings adequately.

Economic accessibility remains a barrier to equitable adoption. Premium wearable devices and subscription models may be unaffordable for many individuals, particularly in low-income regions. Additionally, digital literacy varies significantly, and not all potential users possess the necessary skills to interpret complex biometric feedback, thereby further widening health disparities [4].

4. DISCUSSION

The findings from this study underscore the considerable promise of wearable technology as a public health tool. Devices that track recovery, sleep, and injury risks empower users to adopt preventive behaviors and healthier routines. These technologies not only support individual health management but also have the potential to reduce healthcare costs by shifting the focus from treatment to prevention.

However, for wearable technologies to fulfil their public health potential, systemic barriers must be addressed. Data privacy concerns must be addressed with transparent policies and user control. Accessibility should be expanded through affordable models and initiatives to increase digital literacy. Additionally, device manufacturers should prioritize user-centered design to combat attrition and enhance long-term engagement.

The reliance on secondary sources limits the scope for drawing causal inferences or evaluating real-time user data. The literature reviewed is primarily recent and may not fully reflect the long-term outcomes of wearable technology use. Furthermore, the analysis does not account for regional differences in adoption or cultural attitudes toward health technology, which could significantly influence effectiveness and acceptance.

Future research should address these limitations by incorporating primary data collection, longitudinal analyses, and cross-cultural comparisons to enhance the understanding of these phenomena. Such studies can offer deeper insight into behavior change patterns, chronic disease management, and health system integration. By aligning innovation with inclusivity, wearable technology can become a cornerstone of modern public health.

5. CONCLUSION

This study confirms that wearable technologies are playing an increasingly pivotal role in transforming public health by equipping individuals with tools to monitor, interpret, and act upon their health data. Devices such as smartwatches, fitness bands, and specialized sensors are proving highly effective in areas like recovery tracking, injury prevention, and sleep monitoring, each contributing uniquely to preventive health practices and overall well-being.

The capacity of wearables to track key physiological markers, such as heart rate variability, respiration, movement patterns, and sleep quality, empowers users to make informed lifestyle choices. Personalized feedback and AI-driven insights promote behavior changes that support recovery, mitigate injury risks, and improve sleep hygiene. These capabilities align strongly with modern public health goals of shifting from reactive, treatment-focused healthcare models toward proactive, user-driven wellness management.

However, the widespread integration of wearable technology into public health strategies faces significant challenges. Data accuracy remains a concern, with variability across devices and discrepancies compared to clinically validated measurements, particularly for complex metrics like sleep stages or caloric expenditure. Misinterpretation of imprecise data could lead users to incorrect conclusions about their health status, potentially undermining trust in these tools.

User engagement is another critical issue. While initial adoption rates are high, sustained long-term use often declines due to data fatigue, overwhelming information, or a lack of perceived value. Without effective user interfaces and actionable insights, individuals may struggle to translate raw health data into meaningful behavior change, limiting the devices' impact.

Equally pressing are issues of data privacy and security. Many users remain unaware of how their sensitive biometric information is collected, stored, or shared by device manufacturers and third-party platforms. The absence of robust regulatory frameworks in non-clinical health settings raises concerns about data misuse, which could deter adoption and erode public trust.

Economic barriers and digital literacy gaps also threaten equitable access. Advanced wearable devices and subscription-based services often remain financially out of reach for lower-income populations. Additionally, users require a certain level of digital literacy to navigate apps, interpret complex health metrics, and make data-driven decisions. Without targeted efforts to improve affordability and digital competence, these technologies risk exacerbating existing health disparities.

Despite these challenges, the transformative potential of wearable technologies remains significant. Their ability to promote preventive health behaviors, enable early detection of anomalies, and personalize health management positions them as valuable tools not only for individual users but also for public health systems seeking to reduce the burden of chronic disease and healthcare costs.

For wearable technologies to fulfil this potential, future efforts should prioritize the development of more accurate and clinically validated sensors, user-cantered design improvements that simplify data interpretation, and robust privacy protections to safeguard user trust. Policies and educational initiatives are equally crucial to ensure broader and more equitable access across diverse demographic and socioeconomic groups.

Future research should build upon the insights from this review by incorporating primary data collection, longitudinal studies, and culturally diverse perspectives. Such research can deepen our understanding of long-term outcomes, behavior change dynamics, and regional variations in adoption and effectiveness.

In conclusion, wearable technologies, when implemented responsibly and inclusively, have the capacity to evolve from being mere fitness gadgets to becoming integral components of modern public health infrastructure. They offer a promising pathway to empower individuals, reduce preventable health conditions, and advance the overall health and well-being of diverse populations.

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Article

Managerial Approaches in Different Sports Environments: Case Studies of Football Clubs

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Abstract: The article focuses on the analysis of managerial approaches in two distinct sports environments through case studies of the Polish professional football club KKS Lech Poznań and the Hungarian university sports club Debreceni Egyetemi Atlétikai Club (DEAC). By comparing these clubs, it is possible to identify different approaches to organizational management, finance, human resources, and marketing, as well as their responses to the specific challenges of the environments in which they operate. The research findings indicate that sports clubs, regardless of their size or organizational background, face similar management challenges. The differences are mainly reflected in how these problems are addressed. Larger organizations tend to prefer formal structures and professional staff, while smaller ones rely on flexibility, community cooperation, and university support. Effective human resource management, financial sustainability, and relationship-building with stakeholders are key factors across different types of sports organizations.

Keywords: sports management, sports organizations, human resources, stakeholders, case studies

1. INTRODUCTION

Sports management is based on the application of managerial approaches within the sports environment. It must consider the specific characteristics of sport which influence all aspects of how a sports organization operates. Today, sports management represents one of the main pillars of effective functioning and development of sports organizations. It is the process of managing, leading, and administering sports organizations with the aim of creating social and economic value through sports experiences in all their forms and across all levels of the community [1].

Sports management must adapt to specific challenges such as short seasonal cycles, the high emotional involvement of fans, and the unpredictability of outcomes. According to Shilbury (2022), it is a process of managing sports organizations with the goal of creating social and economic value. Core managerial functions such as planning, organizing, leading, and controlling take place in a constantly changing environment. Sports managers must respond to the demands of fans, sponsors, and the media, with effective decision-making being a key success factor [2].

Managers in sport are often under pressure to make critical decisions quickly. Whether it involves strategic investments in players, logistical solutions, or security measures at events, each decision affects multiple stakeholders. Effective decision-making requires the ability to quickly analyze available information and choose a solution that ensures the smooth operation of the organization [3].

Professional sports organizations differ not only in the sport they are involved in but also in their size and significance. For example, English football clubs are larger and attract more fans than Swedish handball teams. Nevertheless, the basic principles of how sports organizations function are almost identical. They must deal with the unique aspects of business and sports product, as well as with various market actors. Therefore, it is fair to say that all professional sports entities share a similar set of stakeholders [4].

Sports managers must possess strong financial management skills to ensure the financial stability and sustainability of sports organizations, teams, and leagues. Budgeting and financial planning allow them to allocate resources effectively, plan future investments, and minimize financial risks [5]. In terms of club financing, revenue from ticket sales, sponsorship, merchandise sales, and broadcasting rights plays a significant role [6].

Marketing plays a crucial role in building a sports brand and maintaining relationships with fans. When sports managers understand the preferences and behavior of their audience and adapt

accordingly, they can increase fan engagement, boost merchandise sales, and attract desirable sponsors [7].

This customer-oriented concept of sport requires an understanding of consumer motivations and their desire to consume experience and entertainment. At the same time, it demands a broader view of competition, as all forms of entertainment pose challenges in attracting consumers [8].

There is a high demand for qualified professionals in sports marketing, yet the number of graduates who are truly trained and prepared for a successful career in this field remains low. The growing and ever-changing nature of the sports sector requires experts who understand its dynamic environment. As the sports business grows, so does the demand for highly educated young professionals. There is a need for individuals who not only understand the fundamentals of marketing but also possess knowledge of current and relevant practices in the field [8].

2. MATERIALS AND METHODS

The aim of the research was to analyze and compare the managerial approaches and strategies of two sports clubs – the Polish professional football club KKS Lech Poznań and the Hungarian university sports club Debreceni Egyetemi Atlétikai Club (DEAC) – in the context of organizational development, human resources, and crisis management.

The research was conducted using a qualitative comparative case study analysis. This methodology allows for a deeper understanding of the contextual factors and specificities that influence decision-making and the functioning of organizations in real-world settings. The case studies were selected based on the contrast between a professional and a university sports environment, creating an opportunity to identify both differing and shared approaches to management.

3. RESULTS

Case studies of two football clubs illustrate the resolution of problems related to organizational structure and human resource management. The aim is to demonstrate which approaches the individual clubs choose to address these challenges and what results these steps produced.

KKS Lech Poznań

Professional football clubs today operate under market conditions and face the same challenges as commercial enterprises—they must plan, organize, control, build a brand, and manage finance effectively [9]. KKS (Kolejowy Klub Sportowy) Lech Poznań is a prime example of how a well-structured organization and strategic approach can ensure both stability and sporting success in a competitive environment.

The 2010/11 season was not particularly successful for Lech—poor performances on the pitch and financial issues forced the management to seek solutions. A key step was the appointment of a new president, Karol Klimczak. Together with the leadership team, he opted for a modern, business-oriented model of club operation, like those used by major European clubs. The priority became the implementation of a clear management system, transparent division of responsibilities, and efficient organization of internal processes [10].

Among the first steps was the creation of the position of Vice President for Sports Affairs and the strengthening of key departments—marketing, sales, and finance. The club hired new experts with experience in areas such as marketing, social media management, controlling, and merchandising. The club also began to strictly adhere to UEFA financial rules (Financial Fair Play) and focused on building stronger relationships with fans [10].

According to Sznajder 2008 [11], the organizational structure of a sports club should reflect that of a production enterprise, where the production and functional parts are clearly divided—this is precisely the model Lech implemented [10].

One of the major achievements was signing a lucrative deal with the company Inea, which obtained the naming rights to the stadium. At the same time, the club successfully renegotiated new lease terms for the stadium with the Poznań city authorities, significantly reducing operating costs. In marketing, new campaigns were launched aimed at attracting fans back to the stands and strengthening the club's image [10].

The results came quickly. In the 2014/15 season, Lech Poznań became the Polish champion and recorded a significant increase in revenue. The club excelled in player transfer income and

simultaneously managed to increase stadium attendance and club merchandise sales. Satisfaction was also evident among club staff and fans, who appreciated the new leadership and club direction [10].

Lech Poznań thus demonstrates the critical role of a well-designed organizational structure and strategic planning in building a successful sports club. A combination of professional management, focus on marketing, finance, and working with the sports team created a solid foundation for long-term stability and competitiveness [10].

Debreceni EAC

DEAC (Debreceni Egyetemi Atlétikai Club), a sports organization based in Debrecen, faces several challenges common to smaller sports clubs. Although the club lacks significant financial resources, it still manages to maintain solid operations and achieve sporting results. A significant issue the organization deals with is staff planning and the frequent turnover of personnel. Most employees work under temporary contracts or part-time, creating the need for flexible and dynamic human resource management. This issue is further complicated by the fact that employees in some departments are not employed full-time. As a result, the club's organizational structure must be flexible to quickly adapt to needs and current challenges [12].

DEAC addresses these problems through several approaches, which include flexibility in employee management, emphasis on education and university cooperation, and the development of mentoring systems for coaches and other staff. Each of these approaches aims to improve organization, efficiently use available human resources, and achieve quality sports outcomes:

- **Employee recruitment and cooperation with universities –** DEAC emphasizes internal recruitment and frequent collaboration with universities, particularly the University of Debrecen. Students of sports programs could complete internships at the club, where they gain practical experience in a real sports environment. This allows the club to secure high-quality workers while providing young talents with a chance to learn in practice, aiding their future careers. This system ensures that new employees adapt quickly and contribute to the club's development.
- **Mentoring system and education –** DEAC use a mentoring system where experienced coaches help newcomers, ensuring knowledge transfer and faster adaptation. This model allows less experienced staff to learn directly in practice under the guidance of seasoned professionals, which increases the overall quality of the club's human resources. At the same time, DEAC organizes internal training sessions and workshops that contribute to the continuous education of employees and their development in the field of sports management and coaching.
- **Flexible human resources management –** Given that many employees work part-time or on a temporary basis, DEAC has implemented a flexible management model that allows for quick adaptation of staffing to current needs. Managers must respond dynamically to changes, such as sudden departures or the need to strengthen certain departments. This flexibility ensures that the club can maintain operations even in situations with limited resources.

Despite limited finances, DEAC is an example of how smaller sports clubs can maintain sustainability through thoughtful human resource management and collaboration with external institutions. The combination of mentoring, internal education, and cooperation with universities provides the club with access to talent and reduces the costs associated with recruiting and training new staff [12].

In conclusion, both case studies show that proper organizational structure and well-thought-out HR strategy can significantly affect the functioning and success of a sports club. While Lech Poznań demonstrates the benefits of a corporate approach and strategic planning, DEAC proves that even smaller organizations with limited budgets can achieve sporting success through flexibility, education, and partnerships.

Table 1 Comparison of Organizational Solutions in Clubs

Aspect	KKS Lech Poznań	Debreceni EAC
Organizational Structure	**Problem:** Inefficient structure, unclear responsibilities **Solution:** Introduction of a vice-president, strengthening of departments, clear division of responsibilities	**Problem:** Need for a flexible structure **Solution:** Flexible structure allowing adaptation to changes
Human Resources	**Problem:** Lack of qualified professionals **Solution:** Recruitment of specialists in marketing, controlling, and finance	**Problem:** High employee turnover, lack of stable staff **Solution:** Cooperation with the university (students), mentoring system, flexible working hours
Financial Management	**Problem:** Financial issues **Solution:** Implementation of UEFA regulations, conclusion of advantageous sponsorship contracts	**Problem:** Low budget, limited finances **Solution:** Non-financial motivation of employees, cooperation with the university
External Relations	**Problem:** Weak cooperation with fans/sponsors **Solution:** Marketing campaigns, strengthening the relationship with fans, sponsorship contracts (stadium naming rights)	**Problem:** Dependence on external partners **Solution:** Cooperation with the university, support for relationships with the community and university partners

The comparison of both clubs shows that despite differences in size and organizational background; similar problems can be identified as the clubs faced. Lech Poznań responded to its inefficient structure by creating the position of vice-president and strengthening individual departments. In contrast, DEAC opted for a flexible model that allows quick responses to personnel changes.

In the area of human resources, Lech hired qualified professionals, while DEAC relied on cooperation with university students and implemented a mentoring system. Lech's financial issues were addressed through UEFA regulations and sponsorship agreements, whereas DEAC motivated its employees with non-financial benefits and support from the university. Both clubs also worked on strengthening external relations — Lech through marketing campaigns and sponsorships, and DEAC through collaboration with the university and the local community.

4. DISCUSSION

The research findings confirm several conclusions from the academic literature concerning the management of sports organizations. In line with Shilbury 2022 [1], both examined organizations (Lech Poznań and DEAC) applied managerial approaches specific to the sports environment, while considering their organizational structures and social ties within the community. Differences between a large professional club (Lech) and a smaller one (DEAC) manifested in the size and availability of resources; however, the fundamental management principles remained identical. This corresponds with Desbordes et al. 2017 [4], who claim that professional sports entities face similar challenges regardless of their size or sporting discipline.

Pedersen 2011 [2] emphasizes the importance of adaptive decision-making in a changing environment. This proved to be crucial, especially in personnel matters. Lech responded by formally strengthening its structure, while DEAC preferred flexibility and openness toward students, which also represents an application of the stakeholder collaboration model.

The area of financial management, described in detail by Kapoor 2023 [5], was reflected in different approaches to stability. Lech relied on traditional tools such as sponsorship agreements and UEFA regulations, which are typical for larger clubs with access to broader markets. In contrast, DEAC demonstrated an alternative approach through university support and non-financial benefits, thereby

confirming the importance of developing diverse models of financial resource management, especially in smaller organizations.

Marketing activities in both cases reflect the findings of Fetchko et al. 2018 and Britts Imperial University College 2023 [7-8], who emphasize the importance of customer orientation. Lech focused on brand and sponsorship, while DEAC built relationships with the community, which illustrates different pathways for creating value in a sports club.

Finally, the findings confirm the lack of qualified professionals in sports management, as noted by Fetchko et al. 2018 [8]. A solution to this problem can be seen in DEAC's innovative approach of involving students, which also represents a potential model for human resource development under limited budget conditions.

5. CONCLUSION

Despite the benefits of this research, it is necessary to highlight several limitations. The first major limitation is the relatively narrow scope of the case studies, which included only two sports organizations – Lech Poznań and DEAC. Although this selection provided a detailed insight into their internal processes and strategies, it does not allow for broader generalization of conclusions to other types of sports clubs or different geographic regions.

From a geographical perspective, it is important to consider that both clubs operate in specific socio-economic and legislative environments (Poland and Hungary), which influence their managerial responses. Therefore, the results of this study cannot be universally applied to organizations functioning under different cultural conditions.

Based on these limitations, several recommendations for future research appear to be relevant. First and foremost, it would be beneficial to expand the number of case studies analyzed to include clubs from various countries, levels of professionalization, and ownership structures. This would allow for a more robust comparison of management approaches.

Finally, there is considerable research potential in conducting an in-depth analysis of the differences between public and private sports entities in terms of motivation, financial management, community engagement, and overall strategic orientation.

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Article

Modern technology as a tool to prevent security incidents at sporting events

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Abstract: The safety of sporting events is crucial nowadays. With sufficient security, it is possible to ensure the protection of both athletes and spectators. Various modern technologies such as camera systems, detectors, metal detectors, RFID, biometrics or drones or various sensors are used to protect them today. All these technologies make it easier to control and monitor large crowds and prevent security incidents. Thanks to all the data collected, it is easier to detect possible locations for security incidents and, for example, to punish those who caused them. But their use can also raise ethical questions about whether such monitoring and control is compatible with privacy. Finally, there are also legislative issues. In Slovakia, there are legal regulations on what an organizer is obliged to ensure when organizing a sporting event.

Keywords: sport, events, modern technology, protection

1. INTRODUCTION

Sports events are a very popular form of leisure time. In recent years, the safety of sporting events has become one of the key issues in the organization of various public gatherings. This is due to the increasing number of security incidents that take place in places with many different people. There are increasing numbers of violent behavior of fans, various technical disorders but unfortunately also terrorist threats. Ensuring the smooth running of these events is the aim not only of the organizers but also of state authorities such as the police [1].

In the past, some technologies, such as CCTV and the like, have been used as a supplement to conventional security measures, such as security guards. It is possible to say that today it is the other way round. It is the new technologies that are the key security element that security services rely on to identify and deal with security incidents [2].

The various events are a place where people from different cities, social and cultural backgrounds can meet. This makes these sporting events very interesting and have a pleasant atmosphere, but it is also linked to the risk of various conflicts, misunderstandings or security incidents. Therefore, it is necessary to know how to ensure not only the physical protection of the participants so that their rights are not violated. Other modern non-technology than just camera systems can also be used for better crowd control. For example, it can be the use of drones, at the entrances it is metal detectors, thanks to which it is possible to prevent potentially dangerous objects from being brought into the stadiums. It is also possible to use biometrics or RFID bracelets that can be used to identify a particular spectator. These technologies can help to avoid security incidents and make spectators feel safe. However, it also raises questions about ethics and whether it is okay to monitor people in this way and whether it violates their privacy [3-4].

In the conditions of the Slovak Republic, legislation also regulates the provision of sporting events. Act No. 1/2014 Coll. on the organization of public sporting events and on amendments and supplements to certain acts. Also, the Decree of the Ministry of Interior of the Slovak Republic No. 274/2014 Coll. on details of the camera security system deals with this issue [5]. The obligation to install CCTV systems and monitor spectators using them enables organizers to more quickly identify risky people or places where security risks may arise. It is also possible to monitor places with a higher number of people, such as entrances or car parks.

It is not enough to install CCTV or metal detectors to ensure that events are sufficiently secure and that everything works as it should. It is essential that the staff is also sufficiently trained to be able not only to handle and use these non-technologies to their full potential, but also to be able to react quickly enough to possible risky situations and know how to handle large crowds [6]. It is also essential that organizers work together with security forces such as the police.

It is also important nowadays to think not only about physical security in stadiums during sporting events, but also about cyber security. Because many of the technologies used to secure these events are connected to the internet, they are more susceptible to sophisticated cyber-attacks. It is important that the data collected is sufficiently secure so that it cannot be stolen or altered [7].

2. MATERIALS AND METHODS

The article was created based on an analysis of available resources, legislation and case studies that speak to the issue of safety at sporting events. It also includes resources on the use of modern technology at sporting events.

The primary objective was to identify trends and tools that are used to secure sporting events not only in Slovakia but in the world in general. The analysis focused on different areas, from which five relevant parts emerged. The results were processed in the form of a theoretical overview in the field of the use of modern technologies to secure sporting events.

3. RESULTS

From the analysis of available sources, legislation and case studies, it can be said that a modern approach to the protection of sporting events is nowadays very important indeed. This approach should be a combination of physical measures, various difficult tools, modern technologies and qualified people. Based on the knowledge gathered, it is possible to identify five areas that fundamentally affect security during major sporting events.

Technology as prevention

Protection against security incidents needs to be built from the entrance to the event premises. These are places where every single participant must pass through and where many people gather at once. This is where metal detectors, body scanners or turnstiles using biometrics can be effective. Here, for example, it can be a matter of facial recognition or fingerprint recognition. These technologies can filter out potentially risky people as soon as they enter the event area. In the same way, these measures contribute to giving people a greater sense of security and thus reduce the likelihood of panic breaking out in the crowd or the various conflicts that could be triggered, for example, because of insecurity. It is also seen as positive in some cases if these technologies, such as scenery or cameras, are in visible places. It can also have an impact on the sense of security [8].

Motion monitoring

For organizers of sporting events, it is important not only to prevent attacks but also to know exactly how many people are where and to monitor the flow of people at the event. RFID wristbands or tickets with a chip can be used for this purpose, making it possible to know where people are, how many people are there or what sectors they have passed through. This information is also necessary to know when planning how many staff will be needed at each venue, and it can also serve for the traceability of a person. With RFID systems it is possible to dynamically manage the different zones at an event. It is possible to temporarily restrict entry to certain zones or not allow entry during the entire event. These systems can also be augmented with GPS for better tracking of location in real time and thus prevent incidents [9-10].

Camera systems

CCTV systems can be an afterthought when it comes to passive security. As far as the security of sporting events is concerned, camera systems can be linked to software solutions that allow us to monitor crowds and identify suspicious movements, such as gatherings of people or falls and so on. They can also identify inappropriate behavior such as arguments or physical contact. These technologies nowadays can learn and distinguish between normal behavior and risky behavior [11].

In the Netherlands, CCTV systems are used for predictive security, whereby they create risk profiles of people based on past fan behavior, which are later used by the police to plan security measures. This measure came about because of the events of September 2023, when fans repeatedly threw pyrotechnics onto the pitch. However, this measure also has an ethical dilemma as to whether there is an invasion of privacy in such a case [12].

Drones

Drones have boomed in recent years and have been very effective as a complement to traditional methods of protection and to traditional technologies. They are very mobile, fast and able to

react very quickly to changing conditions and in the event of an incident. As far as sporting events are concerned, here they can be used for crowd control, to control the situation in the car park or in places that are less regulated, such as access roads. In the same way, drones can also have thermal imaging cameras, thanks to which it is possible to quickly identify smoke or haze. This allows for a quick response and so damage can be avoided [13].

Technology and people

Adequate technical support to protect a spoofing event is not enough unless the personnel handling the technology are sufficiently trained to know what to do. Various crisis situations can arise during an event, and it is essential to respond immediately and with a cool head. It is therefore necessary for staff to receive training not only in technical security, but also in crowd management, communication and decision-making [14].

4. DISCUSSION

The results of the analysis show that nowadays many different modern technologies are used and implemented during the organization of sparring events. Some of them are already taken for granted, such as camera systems. Some, on the other hand, come as novelties and are used more and more, such as drones.

What is interesting is the boom of drones, which seem to be a very good tool for monitoring spaces that are harder to reach, remote or very crowded. They act as more efficient and more reliable tools than some of the traditional options. Their development is also interesting, with the addition of thermal imaging, which makes it possible to identify different risk situations. The question is how they will develop further and whether it is possible to assume that they will be able to act or make decisions in risky situations in the future.

It is also interesting to observe the psychological aspect of all these measures. When people see these technologies, it can lead to a feeling of greater security and perhaps even a placebo effect, where they think they are maximally protected. Equally, these technologies allow for quick identification and monitoring of spectators, where there is no need for lengthy document checks or just the attachment of a chip with all the data. The question is whether this is a sufficient measure. It would be appropriate to combine random checks of all necessary documents.

People should not be forgotten. People are the key units in many sectors, and the same is true for the protection and use of technology at sporting events. There are still plenty of people who prefer to be led by humans rather than machines and feel safer in the presence of police than in the presence of a camera.

But the biggest question that arises is the question of ethics. It is debatable whether it is appropriate to observe people's behaviour in such detail and thus create patterns of behaviour and identify potentially risky people in advance. It is also questionable whether it is appropriate and safe from a cybersecurity point of view to collect such large amounts of information and data about people nowadays, which is then stored in the online space. This space is increasingly susceptible to various cyber threats, and new ones are also constantly emerging that can threaten this data and information.

Here there is room for reflection on sufficient cyber security for these events. It is one thing to secure them physically. This is a well covered issue nowadays. However, as cyber threats become more widespread, this aspect of protection also needs to be considered. Basically, all the information that is collected during a security event is stored in cyberspace. Here they are exposed to cyber attacks that can modify, misuse or delete this data and information. It is also important to think that not only this information but also the devices themselves are exposed to cyber threats. They can be hacked directly during a sporting event and have some settings changed on them, and they can go from being a harmless crowd-monitoring drone to a dangerous tool.

Today's times are changing very fast, the threats are increasing and therefore it is necessary to constantly develop their protection and to think about the need to develop together with the environment.

5. CONCLUSION

Nowadays, the security of jousting events cannot be ensured with traditional security methods alone. It is necessary to use modern technologies that bring a new perspective and help to react faster

and better to potential threats. It is very good to combine traditional methods of protection with modern technologies.

It has also proved to be very effective to combine technology and sufficiently trained people who know how to work with these technologies and know how to work with people. While the introduction of technology speeds up the whole process of identifying threats and helping to prevent them, it is not sufficient without being controlled.

It is still necessary to think about the legislative side of the issue and, finally, to think about the ethical aspect. To what extent is it okay to use all these technologies and when does this border on a threat to individual rights. The aim is to protect the health of spectators or even athletes.

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Article

Modern trends in information systems architecture in the sports environment

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Abstract: This article explores current trends in the architecture of information systems (IS) within the sports sector, with a focus on cloud computing and artificial intelligence (AI). It presents a comparative analysis of three case studies: the Slovak platform Sportnet.online, the enterprise architecture design for ASPROV PSSI JABAR in Indonesia, and the Atos information system deployed during the EYOF Bakuriani 2025 in Georgia. The study highlights the growing importance of modular and cloud-based architecture, the integration of AI and machine learning for automation and personalization, and the use of standardized frameworks such as TOGAF ADM in sports IT planning. The findings demonstrate that successful IS implementation in sports depends not only on technological innovation but also on strategic planning, user-centric design, and robust data security. The article concludes that these systems serve as models for digital transformation in sports organizations worldwide.

Keywords: sport information systems, modern trends, architecture, IT

1. INTRODUCTION

Cloud-based architectures have become a key element in modern information systems. They bring several benefits and changes in the way systems are designed and operated. Cloud architecture is a set of technologies and infrastructure that enable the provision of computing resources over the Internet.

The basic components include [1]:

- Client platform (front-end),
- Server platform (back-end),
- Service delivery model,
- Network infrastructure.

Cloud architecture models according to NIST [1]:

- Software as a Service (SaaS) - Applications are provided over the Internet without the need for local installation (e.g. Google Docs, Dropbox).
- Platform as a Service (PaaS) - A development and operating environment for applications where the provider provides servers and infrastructure (e.g. Google App Engine).
- Infrastructure as a Service (IaaS) - Customers rent computing infrastructure such as servers, storage, and networks (e.g. Amazon AWS, Microsoft Azure).

Types of cloud solutions [1]:

- Public cloud - resources are shared among multiple organizations.
- Private cloud - infrastructure is dedicated to a single organization.
- Hybrid cloud - a combination of public and private clouds.
- Multi-cloud - using multiple cloud providers simultaneously.

Cloud architecture brings several advantages, including reduced IT infrastructure costs, scalability and flexibility, and the ability to quickly deploy applications. It also improves data security and backup. On the other hand, it also has certain disadvantages. These include provider dependency, security risks and data sovereignty issues, latency and performance issues, and higher costs in the long-term use of cloud services [1].

Cloud architecture represents an effective solution for modern IT systems, allowing companies to optimize costs and increase the availability of their services [1].

Artificial Intelligence and Machine Learning in IS

Artificial Intelligence (AI) and Machine Learning (ML) are key technologies that are transforming modern information systems (IS). Their integration enables process automation, improved analytical capabilities, and more efficient data processing.

Artificial Intelligence

AI represents the ability of systems to perform tasks that require intelligence, such as pattern recognition, decision-making, or learning from data. There are different levels of AI, ranging from narrow AI that solves specific tasks to hypothetical general AI with cognitive abilities comparable to humans [2].

Machine learning is a subset of AI that focuses on developing algorithms that can learn from data and improve themselves without explicit programming.

It is divided into [3]:

- Supervised learning – Models are trained based on input and output data.
- Unsupervised learning – Models look for patterns in data without predefined outputs.
- Reward-based learning – Models learn by interacting with the environment and earning rewards.

Benefits of AI and ML in IS

The integration of AI and ML in IS brings several benefits in various areas [2-3]:

- Process automation – Chatbots, virtual assistants and intelligent systems for document processing.
- Predictive analytics – Analysing big data to predict trends and optimize decision-making.
- Improving security – Detecting cyber threats and anomalies in systems.
- Personalizing services – Recommender systems in e-commerce and marketing.

Challenges of AI and ML

Despite the many benefits, there are also challenges that need to be considered when implementing AI and ML in IS [2-3]:

- Data quality and availability – AI models depend on a large amount of high-quality data.
- Ethical and legal issues – Privacy, accountability for AI decisions.
- Computational complexity – Training complex models requires high computing power.

Artificial intelligence and machine learning are integral parts of modern information systems. Despite the challenges they bring, their potential for innovation and efficiency improvements in various areas is enormous. Developments in this area will continue to shape the future of information technology [2-3].

2. MATERIALS AND METHODS

This article uses a qualitative research methodology based on case studies of three major information systems in sports: Sportnet.online (Slovakia), the ASPROV PSSI JABAR enterprise architecture design (Indonesia), and the Atos system deployed during EYOF Bakuriani 2025 (Georgia).

Data collection was carried out through:

- analysis of available documentation and professional articles,
- study of architectural frameworks (e.g. TOGAF ADM),
- comparison of technological solutions and their impacts on sports organizations.

The aim of the methodology was to identify common features, differences and innovative approaches in the architecture and implementation of information systems in sports. The results were synthesized into a comparative table and infographics.

3. RESULTS

Sportnet.online Platform

Sportnet.online represents a complex digital ecosystem developed since 2014 with the primary goal of increasing the transparency and efficiency of the functioning of Slovak football. The system gradually outgrew its original purpose and transformed into a multifunctional platform used not only by sports organizations, but also by entities from other areas. In 2010, the Slovak Football Association (SFZ) began the process of digitization. As part of this initiative, the Slovak Football Information System (ISSF) was created for SFZ members and the Futbalnet.sk portal used for communication with the public [4].

However, the solution lacked important services and, moreover, the existing solution was unable to handle higher traffic. Therefore, in 2014, the SFZ requested a redesign and optimization of the Futbalnet.sk website and the preparation of its administrative interface. To use this interface more effectively and to develop additional management functions, the administrative interface was placed on a separate platform - sportnet.online [4].

Project goals and challenges

The main objective was to create a universal platform directly connected to the ISSF, which would enable continuous transfer of information in real time. The solution focused mainly on ensuring a faster results service and providing statistics for Futbalnet.sk. The system was also supposed to simplify the work of various groups of users – administrators, coaches and club managers, parents, fans and the players themselves [4]. The project faced several challenges, including the need to provide an intuitive environment and at the same time fine-tune the UX and UI processes in the administration.

Another challenge was adaptation to changing requirements. An important aspect was also the continuous transfer of information in real time between the platform and the SFZ Information System. Finally, it was necessary to ensure data and payment protection, prevent data leakage and prevent unauthorized access [4].

Technical solution and architecture

The development of the platform began with a thorough analysis of the requirements. Subsequently, priorities and pillar functionalities were defined, which formed the basis of the overall platform architecture.

Other functionalities were deployed gradually according to user needs, with an operational response to acute problems [4].

From a technological point of view, technologies such as Node.js, React, Mongo Atlas, Redis.io were used in the development [4].

The platform is built on a modular architecture with a core consisting of a CRM system, which contains basic information and settings of legal or natural persons registered in the system. Users can manage invoices, user membership in individual clubs or member roles. In addition, the platform also includes other key components, such as a user role and rights management system (Roles), a content creation and management system (CMS), a payment gateway integration solution (Paygate) and an authorization mechanism secured according to OAuth 2.0 standards [4].

Other significant features of the platform include a unique connection of content using smart tags, which allows for effective organization and search for information. The platform also supports fast creation of feeds for RSS channels and input data sources, making content distribution easier. Intuitive work with media also includes full-text search, which simplifies working with large amounts of data. Another important functionality is the management of publicly available domains with automatic generation of HTTPS certificates, which ensures secure communication and data protection.

Infrastructure and operation

The project partially operates on the Google Cloud platform with a direct connection to the Mongo Atlas database, which contains over 100 GB of data. This solution provides access to more

extensive monitoring and backup. The platform uses the Cloudflare service, which allows storing copies of frequently used content on servers closer to the user, which ensures faster display of images and videos [4].

For maximum security, the Futbalnet, Sportnet sites and the video archive and media manager services are located on separate servers, each with its own RAM and CPU parameters. Videos and Media provides users with nearly 12TB of storage, allowing for the storage of entire match recordings and images at maximum resolution. The platform is managed by a three-person team with a monthly workload of up to 200 hours [4].

Services and use of the platform

The sportnet.online platform provides a wide range of services such as creating public websites, creating your own e-shop, sharing and publishing calendars, creating discount codes and coupons, collecting data using smart forms, preparing licensing procedures and managing educational activities, archiving videos, selling event tickets, voting and managing sports competitions [4].

The platform ensures the operation and management of all websites intended for communication between the SFZ and the public, including the native mobile application RepreZóna. In addition, it is used by dozens of other organizations to create and manage their own presentation websites or e-shops. Projects implemented on the platform include the sports news website Sportnet.sk, which reaches an annual traffic of more than 10 million users. Another project is Futbalnet.shop, an online store enabling the purchase of goods and services. The platform also covers Dajmespolugol.sk, which supports the development of football among children [4].

Results and benefits

The implementation of the platform has brought significant business results. The database contains approximately 800 thousand personal profiles and more than 8,000 users, with these numbers growing every year [4].

The main benefits for SFZ include a significant increase in the efficiency of all processes, an increased speed of development of additional websites, and an additional source of income generated by paying users. The success of the solution is also confirmed by the interest of the German Football Association, which requested a detailed presentation of the system in otoinspired for its own digital development. The platform has the potential to become a priority management tool for all sports organizations in Slovakia and expand beyond the country's borders [4].

Enterprise Architecture Design ASPROV PSSI JABAR (Indonesia)

Context:

ASPROV PSSI JABAR is the regional office of the Indonesian Football Association in the province of West Java. The project aimed to design a comprehensive enterprise architecture as a basis for the future development of an integrated information system.

Methodology used [5]:

TOGAF ADM (Architecture Development Method) – an iterative framework for enterprise architecture design.

Key implementation phases [5]:

1. Architecture Vision Phase

- Identification of stakeholders, vision and scope.
- Data collection: interviews, observation, literature.

2. Business Architecture Phase

- Problems identified: manual processes, mismatch between vision and IT, ineffective cooperation with external entities.

3. IS Architecture Phase

- Application Architecture: design of web and mobile interfaces.
- Data architecture: centralized database for process coordination.

4. Technology architecture phase

- Infrastructure design: web and mobile platform, security, SOA (service-oriented architecture).

Results:

- Architectural plan created as a basis for digital transformation.
- Identification of weak points and design of solutions.
- Flexible architecture ready for future expansions.

Atos Information System deployed during EYOF Bakuriani 2025

Context:

The 2025 Winter European Youth Olympic Festival (EYOF) in Georgia was a pilot event for the deployment of an innovative sports IS from Atos, the event's technology partner.

System architecture [6]:

- Modular architecture enabling parallel operation across 5 sports venues in 3 cities.
- Scalability for future use at larger events.

Key components [6]:

- Time and results measurement system.
- Results IS with real-time updates.
- Web and mobile application (2000+ users).
- Accreditation system (3334 accreditations).
- Live broadcast system (200+ hours of broadcast).
- Database system with historical data.

Innovations:

- AI-powered media center: automatic generation of videos and edits based on natural language requests.
- Multimedia display system: combination of results and highlights on one screen.
- AI chatbot: provided information about the event and history.
- SportEurope platform: connecting the web, social networks and marketing.
- Gamification: mobile game "Winter Crystal" with digital exploration of Georgia.

Results:

- 60,000 visits to the SportEurope platform.
- 550+ downloads from the Gaudi multimedia repository.
- AI-generated articles were among the most read.
- 30% open rate for email campaigns.

Table 1 Comparison of IS

Criterion	Sportnet.online (Slovakia)	SPROV PSSI JABAR (Indonesia)	Atos IS – EYOF 2025 (Georgia)
Organization	Slovak Football Association (SFA)	West Java Regional Football Association	European Youth Olympic Festival (EYOF), supplier: Atos

Criterion	Sportnet.online (Slovakia)	SPROV PSSI JABAR (Indonesia)	Atos IS – EYOF 2025 (Georgia)
Goal	Digitalization of football, CMS, CRM, results, statistics	Enterprise Architecture Design for Digitalization of Sports Management	Comprehensive IT solution for a sports event
Architecture	Modular, cloud, connected to ISSF	TOGAF ADM, SOA, Centralized Database	Modular, scalable, deployed across multiple venues
Technologies	Node.js, React, MongoDB, Redis, Google Cloud	Web + Mobile Platform, SOA, Secure API	AI, chatbot, video streaming, mobile app, multimedia systems
Functionality	CMS, CRM, Paygate, e-shop, ticketing, video archive, notifications	Player, Club, Competition, License Management, Data Integration	Timekeeping, accreditations, results, AI articles, gamification
Innovation	Smart tags, content automation, connection to ISSF	TOGAF in Sports, Digitalization of Manual Processes	AI media center, chatbot, gamification, multimedia screens
Results	800,000 profiles, 8,000 users, use outside SFA	Architectural Plan for Digital Transformation of a Sports Organization	200 hours of streaming, 60,000 website visits, 1 million Instagram views

4. DISCUSSION

Comparing the three case studies, several key trends can be observed:

1. Modular and cloud architecture is becoming the standard in sports IS. All three systems use scalable solutions that allow for flexible deployment and maintenance.
2. Focus on user experience (UX/UI) is key. Both Sportnet.online and Atos IS emphasized intuitive interfaces and mobile applications, which increases adoption among users.
3. Integration of artificial intelligence is most prominent in the case of Atos IS, where AI generates media content and provides interactive services (chatbot, highlights). This trend indicates a future development towards personalized and automated services.
4. Security and interoperability are essential. All systems address data protection, authentication, and connectivity with other platforms (e.g. ISSF, ISŠ).
5. The TOGAF ADM methodological approach in the case of ASPROV PSSI JABAR shows that sports organizations can also benefit from a formal enterprise architecture design, which increases transparency and efficiency.

5. CONCLUSION

Modern information systems in sports increasingly rely on cloud technologies, artificial intelligence and modular architectures. Case studies show that successful implementation depends not only on technology, but also on a thorough analysis of user needs, security requirements and the ability of the systems to adapt to changing conditions.

While Sportnet.online represents a robust solution for a national sports federation, ASPROV PSSI JABAR demonstrates the importance of strategic planning and Atos IS shows the potential for innovation in the field of sports events. These findings can serve as inspiration for other sports organizations when planning and modernizing their information systems.

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