THE USE OF IT TECHNOLOGY IN SPORTS COMPETITIONS

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Abstract:

Information technologies are considered to be the main reason for the rapid development of the sports industry. IT industry has become necessary for the functioning and development of sports competitions and organizations. Thanks to new technologies coaches have the ability to analyze the impact of their athletes, increasing the precision of the athletes, enabling referees to make equitable decisions, improve the quality and design of sports companies, as well as providing fans a better view of sports performance, while managers can much more easily organize sports competitions.

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INTRODUCTION

Information technologies are considered to be the main reason for the accelerated development of the sports industry. According to research by consulting firm ATKearney, the estimated value of the sports industry is about $620 billion. [1] Today, new technologies have become necessary for the management of sports organizations, which include the global world sports organizations (International Olympic Committee, FIFA, UEFA, FIBA, NBA, NFL), national sports federations, sports clubs in charge for organizing sports competitions, production and promotion of sports products (Adidas, Nike, Puma, Under Armour, Asics), broadcast of the latest information and videos via sports media (Eurosport), entertainment industry which includes sports video games (EA) and sports betting (William Hill, Ladbrokes, bet365, bwin, Paddy Power, betfair, Unibet).

Thanks to new technologies in sports competitions, coaches have the opportunity to analyze the sports performance of their athletes during competitions, increase the accuracy of athletes, enable referees to make decisions, improve the quality and design of sports companies' products, and give fans a better overview of sports competitions. New technologies have become an indispensable part of sports venues (stadiums, halls and swimming pools), which aim to monitor potential hooligans among fans, so that the police can react in time and prevent potential conflicts, both between fan groups and between fans and police.

2. THE ROLE OF THE INTERNET IN THE SPORTS INDUSTRY

Thanks to the Internet, information about your favourite athlete, club, national team, sports product or sports company can be found out in a few seconds. Each sports club has its own web presentation as well as on social networks such as Facebook, Twitter or Instagram, used by sports organisations to promote and inform their fans. Also, coaches use the web to analyze others athletes or teams before sports competitions.

Globalization has become one of the main topics today. "If we understand globalization as a process of international rapprochement in the field of economy, social order and culture, we see that it is ubiquitous. Marketing with its theoretical background and practical application are no exception. In addition to economic and political integration processes, largely thanks to the Internet, we are witnessing the globalization of the world. The Internet can intensively help sports marketers to develop the sports industry and sports products and dominate the sports market". [2, p. 105] Some important marketing constants, such as time and place, are being completely redefined and new theoretical and practical interpretations and applications are being sought. New possibilities of direct marketing communication with consumers are opening up. Although this topic is widely discussed in our professional circles, the Internet is mostly viewed as a medium for activities within certain marketing functions or even exclusively as a medium suitable for improving certain promotional activities, i.e., market research activities. Contrary to this established view, we believe that electronic communication through online environments can and must be viewed as one of the key ways to innovate in marketing. Today, every sports club or sports company uses the benefits of the Internet to present and promote novelties related to the club or

company, whether it is a game played or new products that are yet to appear on the sports market.

Today, the Internet has become an indispensable part of everyday life, a necessary thing that makes life easier for ordinary people. Every famous athlete today has their own website, where their fans can find out details related to their career or life, promoting themselves and their skills, not only in sports but also in other markets. The Internet is considered to be the largest database and an increasingly successful one-on-one response mechanism. It is important to point out some of the often mentioned important determinants that must be respected when designing the connection between marketing and the Internet:

1. The digital age requires new ways of thinking and new business philosophies,
2. The digital age makes technology accessible and transparent,
3. In the digital age, people have never been more educated and confident,
4. People care about themselves, but also about the environment
5. The Internet primarily conditioned the revolution in communications, and secondarily in technology.

To illustrate the use of the Internet, we must mention the Nike website. The particular importance in the Nike promotion belongs to the website where sports products intended for sports competitions are promoted. Information about the company's history, products, activities, facts about the company can be found on the website www.nike.com. Impressive and recognizable strong slogans, thoughts and messages dominate the site. Adaptations were also made to users from different geographical areas with the possibility of choosing the desired language. Segmentation into continental markets has also been performed. Although there is a basic common logic and connection in the appearance of the site, certain deviations have been made depending on the market for which part of the site is intended. For example, the choice of sports and promoters is adjusted to the representation and popularity of certain sports.

1.1. INTERNET IN SERBIA

The Internet breakthrough in Serbia occurred in the mid-1990s, after the Dayton Agreement and the lifting of sanctions. Today in Serbia about 73% of the population has access to the Internet. We all agree that the internet is necessary. Internet brought about huge changes and made people's everyday lives easier. Online shopping has become very common in economically developed countries as well as in Serbia. For example, today the average American, due to lack of time, rarely goes shopping because they spend more time on the Internet, visiting various sites, buying sports products that interest them and that are delivered to their home address. Today, the citizens of Serbia are increasingly buying online sports equipment, both due to the lack of time to visit stores, and due to the greater offer of sports products online than in stores. When buying sports equipment, many companies offer discounts for online shopping. At the same time, consumers can find products of interest to them much faster with the help of filters, compare them with other products by different criteria such as new collection, footwear or clothing, size worn by consumers, product selections for men, women, boys or girls, as well as discount sizes.

2. IT IN SPORTS

Thanks to GoPro cameras, extreme sports began to develop rapidly and gain in popularity. Viewers can see from the angle of the athletes themselves what it looks like to compete under high adrenaline. The Euro-league, in cooperation with the company "First Vision Cam" and the TV station "Kanal Plus", made an experiment where the players of the Lithuanian basketball club Zalgiris played in the jerseys with installed mini cameras, which had the task of conveying to the audience an insight into the new dimension of basketball from the basketball court. [3] The point is to understand what it means to be dishonest from a technological point of view in a particular sport. Cheating in sports is a disagreement between what is possible with current technology and what the rules allow.

3. SOFTWARE IN THE SPORTS INDUSTRY

Software development has greatly contributed to the development of the sports industry. Ticket sales are increasingly taking place online. Thanks to the latest software, tickets for the most sought-after matches are sold out in 15-20 minutes from the time of sale on the Internet, while all Super Bowl tickets are sold out within minutes. Among the most popular software in the sports industry are SAP, KORE, EMS, CRM, Arial and others. Sports equipment companies already make extensive use of software such as SAP (System Analysis and Program Development), which provides a complete set of functionalities for business analytics, finance, human resource management, logistics and corporate services.

SAP [4] also offers programs such as: Advanced Planner and Optimizer (APO), Business Information Warehouse (BW), Customer Relationship Management (CRM), Supply Chain Management (SCM), Supplier Relationship Management (SRM), Human Resource Management Systems (HRMS), Product Lifecycle Management (PLM), Exchange Infrastructure (XI), Enterprise Portal (EP), SAP Knowledge Warehouse (KW) that have become essential for the functioning of any serious company. SAP is the third largest software company with about 40,000 employees and revenue of $ 9.4 billion. The operation of global companies without the use of the above software is unthinkable today.

The use of new technologies has become necessary for work in sports organizations. When someone is applying for a job in international sports organizations, the candidate is required to know computer skills. Candidates are expected to know how to use the MS Office package, which includes programs such as Internet, Outlook, Word, Excel, Power Point, while recently more and more companies and sports organizations are using the SAP program. Also, there is an increasing number of sports coaches and clubs that use the services of the Synergy program, which relates to scouting and detailed analysis of teams and players (corp.synergysportstech.com).

Performance analysis in sports teams has become a segment of the sports industry with a fast developing. Advances and the availability of technology and data have transformed this sector and expanded the game-changing benefits that clubs can achieve through the adoption of performance analytics. David Brailsford's term "marginal gain" is now a universal matrix for clubs and teams to gain that competitive advantage. Hoodle is at the forefront of this analytical revolution, developing commercial tools and talents to provide performance analy-

Figure 1 - Sports analytics.

sis to sports at all levels. We see behind the scenes how clubs implement Huddle technology to drive innovation and advancement and support talent for career development in this growing sector within the sports business. Derby County Football Club has one of the most advanced video analysis departments in English football. It is no surprise that the two-time champions of England decide to invest in technology. [5]

4. DIGITAL TECHNOLOGY IN SPORT

Thanks to the great innovations it has introduced into the sports industry, digital technology has made its functioning much easier. Media houses now have better recordings of sports competitions, sponsors can be graphically inserted on the screens to give viewers the impression that the sponsor's logo is on the field. Security is now at a much higher level because security cameras cover the entire sports facility, which in the event of an incident makes the job of the police and security much easier.

4.1. DIGITAL GRAPHICS FOR MATCH TRANSMISSION

The first example of digital graphics was "January 1997, when virtual marketing was tested in Italy during the Lazio-Victoria Guimareas match, i.e., processing TV signals to insert personal advertising messages or inscriptions on the football field that are not present in the replay". [6] Today, digital graphics have become commonplace, where the sports market is looking for advertising space in all possible ways that could be sold to

sponsors. Digital graphics have become very important in TV broadcasts, where sponsors have increasingly promoted their logo or product during sports broadcasts. The video game industry has made "virtual stadiums" and moving players on the field in 2D technology, which today works almost the same as during the broadcast of football matches.

◆ Video game industry: e-Sports

The video game industry has been around for decades. With the development of new technologies, the video game industry has developed in parallel, retaining old users and at the same time attracting new generations. In recent years, the video game industry has become an increasingly important part of the sports industry.

More than 20 years after the first video game tournaments, e-Sports tournaments now attract an audience that builds on the biggest traditional sporting events; popular live streams attract more than 100,000 online viewers during the week. Companies such as Coca-Cola and Nissan have joined Logitech and Red Bull as tournament sponsors who have positioned themselves in a new segment of the sports market. Gaming is what every traditional sports league wants to become: young, global, digital and increasingly diverse.

How big is the video game industry? About 205 million people watched or competed in video games in 2014, according to market research firm Nevzoo - which means that if e-Sport represented the nation in terms of number of participants, it would be the fifth largest in the world. Although e-Sports has long been the largest in Asia, especially in South Korea, countries like North
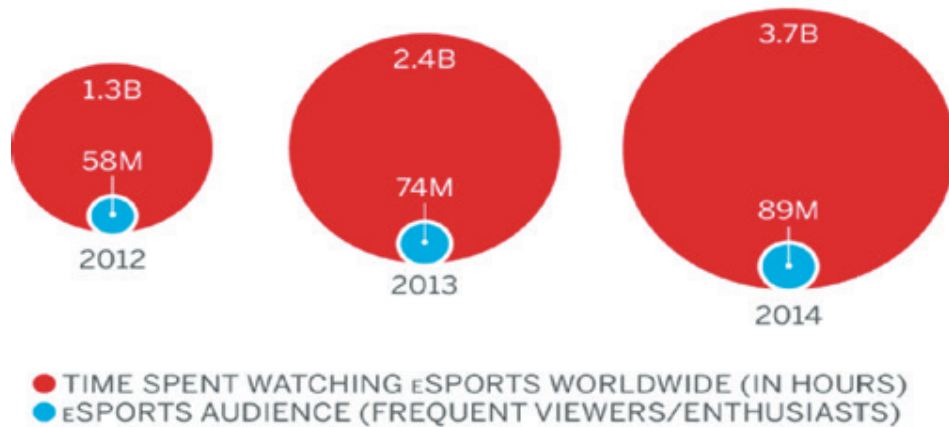
Figure 2 - Video Game Industry Market.

America and Europe have 28 million e-Sports fans, with that number growing by 21% a year. [7] In some countries (e.g., Japan), the best gamers have the status like the most popular athletes. Their competitions are broadcasted on TV and other media, while the interest of sponsors is growing every year. Sports video games have a role to give users the opportunity to be coaches or managers, to show their skills by competing with each other in the best sports leagues such as FIFA, UEFA, NBA, NFL, NHL and others. Users of video games are mostly young sports fans, aged 10-25. Among the most popular video games are Top 11 and FIFA (series).

4.2. DIGITAL TECHNOLOGY IN SPORTS BETTING

The development of the sports betting market is closely linked to the development of new technologies. Sports bookmakers account for 13% of the global betting market. The fastest growing segment is online betting. In 2012, William Hill betting had about $ 2 billion in revenue. Estimates say that the sports betting market is estimated at $700-1000 B, while the market of illegal betting is estimated at $500 B. The number of employees in the betting sector in the United Kingdom alone was around 55,000 in 2013. Currently, the largest sports betting market is Asia. [8] Thanks to the Internet, it is now possible to bet during the sports matches. With the help of new software, quotas are being created that should challenge sports fans to invest their money. In order to challenge sports fans, bookmakers allow people to bet in all possible ways. In England, the ticket paid by the father of the Manchester United football player attracted the attention of the media, betting that his son, who was only nine at the time, would one day play for the first team of Manchester United. For the £ 100 paid, the winner earned £ 10,000. The Internet allows betting service users to inquire about athletes, club and national teams, their current state of the championship and potential problems, in order to invest their money by betting on them.

Digital technology in the service of sports referee's

With the advent of new technologies, the quality of sports has risen to a higher level. New technologies have also contributed to calming passions on the field, both among the participating athletes and among the fans themselves. The human eye is not sinless, especially if the quality of the sports referee's vision is in question. However, no one questions the quality of new technologies. One of the most valued is Hawk - eye technology [9], which is one of the leading ways of visibility analysis that has the task of assisting referee's in making decisions in sports. Hawk-eye technology first began to be used in cricket in 2001 and was later used in sports such as tennis, football and baseball. Hawk - eye allows all kinds of statistical analysis, such as rebound trajectory, ball speed, whether the ball touched the line, whether the ball crossed the goal line. Their simulator has received positive reviews from Tech Radar [10], a magazine that deals with testing new technologies. In basketball, for analysis of controversial decisions, referees are allowed to use repeated slow motion from different angles to make a fairer decision.

Figure 3 - Hawk – eye.

4.3. DIGITAL TECHNOLOGY IN THE SERVICE OF SECURITY OF SPORTS VENUES

When organizing sports competitions, the following technical means are used for the implementation of security measures, such as: video surveillance systems, access control systems, counter-sabotage doors, counter-sabotage X-rays, counter-sabotage mirrors, hand-held metal detectors, alarm systems fire, means of communication (stationary and mobile).

These technologies make the police officers job easier to spot potential hooligans and remove them from the stadium, while footage from the stadium will serve as evidence in criminal proceedings before the court.

5. TECHNOLOGY IN SPORTS EQUIPMENT

Thanks to the development of new technologies, the largest sports equipment companies "Adidas", "Nike" and "Puma" have raised the quality of business of their companies to a higher level. A few decades ago, the company's system of work was reduced exclusively to the manual production of sports equipment, while today, the same companies rely on new technologies thanks to which they have increased their production and profits. Sport today is not only about achieving maximum performance of athletes, but at the same time minimizing the energy we spend while running or swimming [11]. New technologies have revolutionized sports such as swimming thanks to special polyurethane suits, but a few years later those same suits were banned because they brought a great advantage over the competition.

Figure 4 - Monitoring of sports facilities.

Figure 5 - Technology in sports equipment.

Helmets for cyclists and oars for rowing, kayaking and canoeing disciplines, made of lightweight materials that reduced the pressure of dragging through the air or water, contributed to setting new records. Many people condemn the use of technology in sports to improve the performance of athletes, although this has become inevitable, because the sports industry in which technology and sports equipment bring big profits by breaking records does not want to stagnate for moral reasons.

6. CONCLUSION

The development of the sports industry is connected with the parallel development of training, media, digital and software technologies, security technologies as well as technologies for the production of sports equipment. The IT industry has revolutionized the development of the sports industry. Sports literature, which in previous decades was manually procured from America and Europe, is now available in a few seconds thanks to the Internet, translated into all languages. With the advent of the Internet, the media has expanded its business to more segments. The Internet has raised the level of information of sports fans, developing online media that have accelerated the flow and amount of new information, while on the other hand due to too much information began to violate the privacy of athletes themselves, allowing everyone to learn about their family members, financial situation, personal problems. Thanks to new technologies, the career of professional athletes is today, on the one hand more difficult because it requires

longer seasons, more matches, while on the other hand it has facilitated the way of advancement, improvement, analysis, preparation and recovery of athletes. Thanks to new technologies, today we have the opportunity to shoot new records that are being broken every day. Without new technologies, it would be difficult to know what is the fastest result in running, what is the strongest hit with a hand, foot, racket or stick, how much is the pressure on the human body in water, wind or while running.

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