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DIGITAL TRANSFORMATION: THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGY TOOLS IN STRATEGIC MANAGEMENT IN THE BRAZILIAN SOCCER MARKET

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Abstract: this article reports on how the use of information and communication technology (tic) has been a tool for digital transformation in the Brazilian soccer market. The aim of this work is to list and analyze how, in a systematic way, the panorama of tic tools helps the professionals who work in this sector in search of better results, considering the human, physical and financial resources for the practice and performance of the sport. It is clear that the relationship between the evolution of soccer and the use of technology has been increasingly close and strongly influenced in recent decades, certainly on a path of no return, which will perpetuate in the future.

Keywords: digital transformation, soccer, clubs, technology.

INTRODUCTION

The practice of soccer in Brazil began in mid-1895 and has become a sport that has contributed to many transformations in Brazilian society, including the country's economy. It is estimated that in 2022 alone, the Brazilian soccer market generated approximately 8.8 billion Reais (FAVORETTO, 2022).

This change from what was initially an amateur sport, with the creation of clubs and associations that had a recreational purpose, to a professional, corporate and strategic environment, which now has a billion-dollar turnover. It can be seen that, especially since 2003, the use of Information and Communication Technology (ICT) has increasingly been a tool for the digital transformation of the sector, due to the communication environment of social networks that brings the target audience closer to the teams and the use of technology-based tools to help manage results.

The general objective of this study is to analyze the use of technological tools by clubs and teams, as well as to systematically

analyze the panorama of ICT tools that help professionals who work in Brazilian soccer in search of better results, considering the human, physical and financial resources for the practice and performance of the sport. This study also sought to:

- Grouping the IT tools developed for the sector according to established variables;
- Analyze the contribution of these tools within your line of work to the sector's best performance;
- Present how the digital transformation leads to the emergence of new solutions that are gradually absorbed and applied to the sector;

RESEARCH METHODOLOGY

This is an exploratory bibliographical study in which scientific papers and journal articles were researched in order to systematize information and technological products.

Exploratory bibliographical research, which according to Antonio Carlos Gil (A. C., 2007) is a methodology that usually involves a bibliographical survey, interviews with people who have had practical experience with the problem being researched and analysis of examples that stimulate understanding.

The information was collected during the year 2022. To carry out the research, a theoretical survey was carried out through specialized channels and interviews with professionals in the field who work in the same soccer market.

The search criteria were articles published in magazines and/or portals specializing in information technology or the soccer market, published in the last 10 years. These described experiences and results of using ICT in Brazilian soccer.

After the initial survey, the main findings were synthesized after a thorough reading of the content on the subject, taking into account the aspects relevant to the research objective of analyzing the impact of ICT (Information and Communication Technology) as a tool for digital transformation in the Brazilian soccer market.

RESULTS AND DISCUSSION

Soccer is one of the most popular sports in Brazil and its history dates back to the late 19th century. The first record of a soccer match in the country took place on April 14, 1895, in São Paulo, when a group of British residents organized a game among themselves. From then on, the sport became popular among São Paulo's elite and spread to other regions of the country.

In 1902, Charles Miller, considered the father of soccer in Brazil, founded the first Brazilian soccer club, the São Paulo Athletic Club. Soccer was still an elite sport and only gained popularity among the lower classes of society from the 1910s onwards. In 1914, the Brazilian Football Federation was created to organize state and national championships.

In the 1920s, Brazilian soccer began to stand out internationally. In 1922, the Brazilian team played in its first official tournament, the Copa América, losing the final to Uruguay. In 1930, Brazil played in the first World Cup in Uruguay and finished in 6th place.

From the 1950s onwards, Brazilian soccer experienced its most glorious period. The Brazilian national team won the 1958, 1962 and 1970 World Cups, with legendary teams such as Pelé, Garrincha and Zico. In addition, Brazilian clubs such as Pelé's Santos, Zico's Flamengo and Raí's São Paulo won international titles and became known around the world.

In the years that followed, Brazilian soccer continued to produce great players and teams, and since the beginning of the 21st century it has also been using ICT as a digital transformation tool to boost its development on the pitch and in the environments that surround it, such as stadiums, clubs and confederations.

This whole historical process confirms the cultural importance of the sport for Brazilians and the reasons why an ever-increasing number of fans and supporters have started to mobilize growing financial resources, infrastructure and investments. In this sense, beyond the practice of a sport, soccer has contributed to the formation of a cultural trait in Brazilian society, with obvious impacts on our social organization, including in economic terms. According to DaMatta (DAMATTA, 1998) in Brazil, clubs, associations or any other type of group are formed in such a way as to encompass the greatest number of different social representations, which ended up favouring the development of clubs as business organizations, highly strategic in their conception and management.

Soccer is a very lucrative industry both in Brazil and around the world. Estimates suggest that Brazilian soccer generates approximately R\$8 billion annually, (FAVORETTO, 2022). This includes revenues from broadcasting matches, sponsorships, ticket sales and merchandising, among others. However, it is important to note that these figures can vary greatly depending on the performance of the clubs and the popularity of the players.

On a global level, the soccer industry is even more significant, generating billions of dollars every year. In 2021, for example, the total revenue of world soccer was estimated at US\$ 28.5 billion (around R\$ 152 billion), according to data from consultancy firm Deloitte. This revenue is generated mainly through match broadcasts, sponsorships, ticket sales and licensed products, among others.

Thus, seen as an increasingly lucrative market, clubs need to continue to evolve their business models. In this sense, the use of ICT as a tool for organizing processes, analyzing data, managing resources, improving communication and monitoring are essential:

Performance Analysis: Teams are increasingly using performance analysis software to collect and analyze data on players and the team as a whole. This data includes information on positioning, movement, finishing, passing and other aspects of the game. Based on this data, coaches and fitness trainers can identify the strengths and weaknesses of players and the team, and work to improve performance.

This data is collected by sensors, micro-cameras and even drones and analysis software to obtain accurate statistical data on each player. (UNISPORT BRASIL, 2017). This process is considered crucial for the selection and even signing of a player, allowing managers and coaches to make precise choices for the formation and line-up of a team.

Injury monitoring: Clubs use technology to monitor player injuries and prevent new ones from appearing. This includes the use of motion tracking devices and wearable sensors to assess players' physical condition.

Of particular note is the use of Artificial Intelligence technology developed by the American company Zone7. Using this intelligence, it is possible to predict injuries in athletes through video analysis of matches and medical history. In Brazil, clubs such as Palmeiras have been using monitoring belts since 2020 to monitor players during training and matches, acting proactively to prevent injuries (GAZETA ESPORTIVA, 2020).

Club and team management: Team management software is used to organize information about players, contracts, salaries and other administrative issues. This helps clubs make more informed decisions about signings, contract renewals and other important issues.

There is a large supply of IT companies on the market that specialize in developing and marketing software dedicated to club management, such as Easyfoot, Society, Club System, to name a few, as well as contract management and athlete agency, such as MyRequests, Sispro, etc. This is a huge demand that is attracting companies such as SAP (ITSS TECNOLOGIA, 2020)SAP's project list includes the implementation of SAP B1 by Palmeiras in 2013 and later by Grêmio in 2014.

Communication: Clubs use communication apps to communicate with players, staff and fans. This includes the dissemination of news, training and match schedules, among other relevant information.

In an increasingly digital age, the experience of a match goes far beyond the game itself. Practically every team in the A series of the Brazilian Championship has its own *mobile app* where fans can get information such as the team's line-up, how to get to the stadium, the team's preparation for the match, even before arriving at the stadium.

Another important point is the structure of the stadiums, which are increasingly embracing technology to offer entertainment, as in the case of Allianz Parque, which has installed 103 m2 screens and a sound system for announcing and broadcasting the best moves of the match, so that fans don't miss any detail, regardless of where they sit (JOVEM PAN, 2014). In the same strategy, Arena Corinthians installed TVs in the stadium's toilets, so that fans don't miss a single shot of the match (RIBEIRO, 2014). In the case of Atlético Mineiro in its new stadium, Arena MRV plans to improve the experience of a smart stadium for its fans by providing an app that allows them to buy products from the food court before even entering the stadium, (SANTANA, 2022).

It can be seen that the investment in Wi-Fi infrastructure to improve the fan experience at matches is not a differentiating factor in terms of services, but a necessity for clubs to provide for their fans.

Marketing and Sales: Technology is also used by clubs for marketing and sales purposes. This includes the use of social media to disseminate news and promotions, online ticket sales and other related services.

Thinking about the Brazilian market, the use of technology goes far beyond sales, solving problems in the control of sales and correct access to stadiums. As in the case of Clube Palmeiras, which has implemented turnstiles capable of facial recognition of fan members, preventing the ticket from being used by a person who is not a member, thus improving security. (GUARIGLIA, 2023).

Refereeing and Confederations: This is a technology already known for its functionalities such as radio frequency communication between referees, the VAR (Video Assistant Referee) and virtual offside lines. Soccer confederations also use technology to manage competitions, through electronic line-ups and summaries, platforms for publishing results and statistics in real time, thus allowing clubs to manage their line-ups and avoid having players suspended. With the appropriate use of technology, confederations can also improve the quality of soccer and make competitions more efficient and fair.

Osni Dantas, technology manager of the São Paulo Football Federation, in an interview with AbeInfo (ABEINFO, 2022) highlights how the Federation has been undergoing a constant digital transformation, and how the business models are completely based on and dependent on the technology employed. This scenario requires constant modernization and monitoring of the technology infrastructure and investment to provide and maintain the availability of services.

We can see that the digital transformation of soccer through the use of ICT as a tool for competitive advantage has intensified since 2010 and is increasingly gaining ground and becoming essential in the practice of the national passion sport. Table 1 groups together the main technological solutions for responding to problems and demands in the sector

Solution	Function	Objective
PowerBI, Hudl, InStat and Wyscout	Player performance analysis	Analyze statistical data from matches and training sessions, assisting the coaching staff;
Zone7	Injury Prevention	Use of AI to analyze statistical data and players' injury histories, reducing the incidence of injuries by 30%.
Easyfoot, Society and Club System	Club and association management	Management software for clubs and associations.
MyRequests and Sispro	Contract management	Organize, control and monitor the numerous contracts between clubs and players.
ERP (SAP B1, Microsiga)	Business Management	Assisting in the management of the soccer team in functions such as HR and Finance.
Team App and Screens	Communication	Optimize communication and interaction between club and fans,
Wifi in stadiums	Communication	Facilitating fan connectivity within stadium facilities
Ecommerce	Marketing and Sales	Create a sales channel for tickets and licensed products between the club and fans.
Facial Biometrics	Access Control	Controlling access to stadiums for socio-fans, inhibiting the sale of money changers.
VAR and virtual offside line	Arbitration	Investigating difficult shots during a soccer match, increasing the accuracy of refereeing.
Electronic summaries	Arbitration	Present the results and statistics of a match with speed and precision.

Table 1: Grouping of offers of information technology solutions applied to the soccer market, based on all the above content.

CONCLUSIONS

The relationship between the evolution of soccer and the use of technology has become increasingly close in recent decades. From the use of cameras to help referees make decisions in controversial matches, to the use of high-tech equipment to analyze the performance of players and teams, to club management and stadium infrastructure, technology has had a significant impact on the Brazilian soccer sector.

The study showed through examples how the technology used in VAR (Video Assistant Referee) has influenced the entire working structure of referees and confederations, generating a constant need to apply the technology in a match in the major leagues.

In addition, technology has been widely used to analyze the performance of players and teams. Video analysis software, sensors and motion trackers are some of the technological resources that are used to collect and analyze data on the performance of players and teams. All this apparatus allows coaches and players to identify strengths and weaknesses and work to improve their performance and make more assertive decisions.

Technology is also involved in improving stadium infrastructure and the fan experience, with features such as more efficient lighting systems, high-definition screens and mobile applications that allow fans to follow the game in real time and access additional information. It makes the soccer experience even more enriching, and makes everyone feel more and more part of the match.

However, clubs need to manage an ever-increasing amount of revenue, and an ever-increasing number of employees, in order to keep the necessary structure running. And with that, technology comes to the rescue once again, with its management software that allows the entire flow of information to be kept under control and secure.

In short, the evolution of soccer has been heavily influenced by technology, and this is certainly a path of no return, and will continue in the future, ever more widely, with new innovations being developed to further improve the game and the fan experience.

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